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INDUSTRIES  
Page 10

**34 Maintenance in Action** — with topnotch, thorough crew

**82 Power Unit Serves Two Paving Plants** — picture story

**100 New Piers for Old** — remodeling job widens center span

# CONTRACTORS and ENGINEERS

A Buttenheim Publication

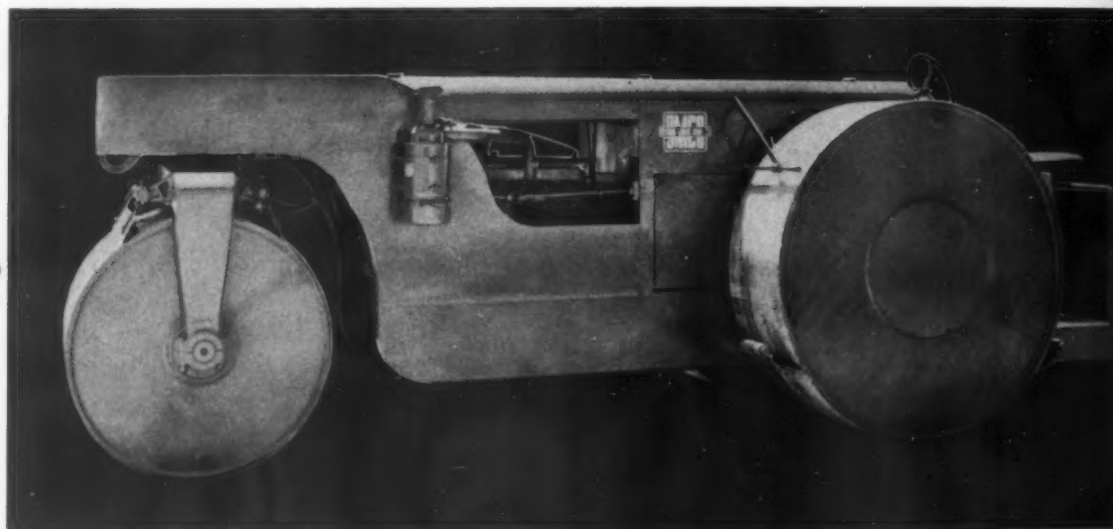
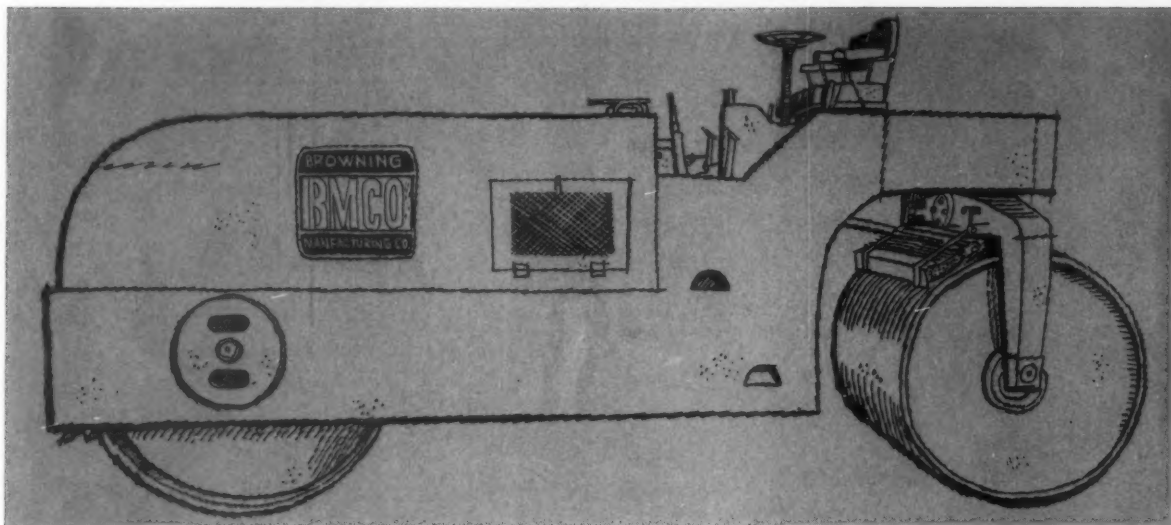
MAGAZINE OF MODERN CONSTRUCTION

APRIL 1960





# GIVE YOURSELF THE ADVANTAGE OF THE RIGHT COMPACTION EQUIPMENT



BMCO steel wheel rollers are deliberately designed for ease of operation and rugged dependability. Outstanding features include:

- Automotive type power steering
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The extremely low silhouette of the three-wheel rollers gives the operator maximum visibility, and the extra large platform is equipped with a safety guard rail. Tandems feature over-sized water tanks with large filler plugs; large plates on both drums to permit loading ballast with a hand shovel; minimum of overhang to reduce hand finishing near walls; and removable rear cowlings for ease of routine servicing.



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# CONTRACTORS and ENGINEERS

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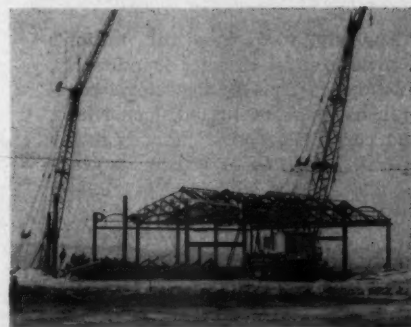
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Gantries placing concrete for the Niagara generating plant at Lewiston, N. Y., downstream from the falls, use three gantries that run at different levels along the length of the 400-foot escarpment. American and Washington gantries are being used for the work.  
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## Editorial

# Better Highways NOW

Save Lives • Save Time • Save Money

The above title is the slogan that has been adopted by the Better Highways Information Foundation, a public-service group that represents a comprehensive cross section of highway and related industries and interests. Sparked by the American Road Builders' Association, but now an entirely autonomous nonprofit foundation, the BHIF is being guided by five founder trustees, chosen from Associated General Contractors, Construction Industry Manufacturers Association, ARBA, Associated Equipment Distributors, and highway officials. The individual trustees are: J. P. Gibbons, chairman, Highway Contractors Division, AGC; Kenneth Lindsay, a past president of CIMA; Paul B. Reinhold, a past president of ARBA; H. D. Anderson, a past president of AED; and George M. Foster, executive director, Indiana State Highway Department.

From this nucleus, BHIF is planning to expand to include membership from many other groups that are influential in national and community life. These groups will represent government; communications media; educational, patriotic, fraternal, service, safety, civic, and other key organizations. The foundation's basic aim is to develop an over-all highway information program at all levels of national life.

Anybody who uses the nation's highways, either directly or indirectly, should recognize the need for a comprehensive, coordinated, consistent, and continuing program of highway information. This is particularly urgent right now when the \$40 billion road program is running into difficulties, and when it is feared that the 41,000-mile Interstate System, now under construction, may lag far behind the original 1972 completion date. With the car population in this country ever spiraling upward, we cannot let the road program slip backward.

Of the 41,000-mile Interstate System that was started with the 1956 legislative program, 12,000 miles of new highways are either finished or under construction, while 2,000 miles of toll highways have been incorporated into the system. That leaves some 27,000 miles yet to be built. The total cost of this program has been climbing from the original \$27 billion estimate. Some experts now figure that it will cost around \$45 billion.

Financing is a big problem, particularly with the apportionment of federal-aid funds for the primary, secondary, and other categories of the road

system known as ABC highways. Cutbacks in appropriations, as has been suggested, would be disastrous in view of forecasts indicating a heavy increase in traffic in the years ahead.

Unforeseen expenses also have arisen. The Defense Department feels that the standard 14-foot vertical clearance at overpasses on the Interstate System is insufficient to accommodate trucks hauling ballistic missiles. Some defense experts contend that clearances should be increased to 16, 17, or even 18 feet. Any increase in bridge heights would add immeasurably to the cost of the road program, imposing severe drains on an already inadequate Highway Trust Fund.

BHIF, through its planned good-roads movement, intends to reach those who use the highways or are benefited by them, and to make each individual aware of the importance, as well as the cost, of the highway system. It will urge all those with an interest in the road program to develop this interest in their communities. Talking only to people in their own industries is not enough. BHIF aims to get to the grass roots of the country in enlisting support for its objectives. It has engaged a public-relations firm to prepare informative material for promoting its highway goals at national, state, and local levels.

It will stress the positive, pointing out the many ways that highways affect the economy and the entire way of life. The modern, limited-access highway is opening up undeveloped lands for housing projects. Factories and industries can move out of crowded urban areas into more favorable sites in the country along one of these superhighways. Real-estate values have risen as marginal or waste land is transformed into school or shopping-center sites. Time and money are saved as workers get to their jobs more easily, while raw materials and finished products are moved that much faster to plant and market.

But most important of all is the safety factor. The multiple-lane highway with wide medians separating opposing traffic eliminates many hazards to life and property. These modern roads with flat curves, easy gradients, and gentle side slopes should help reduce the appalling fatalities on our highways.

Now is the time for everyone to get behind the Better Highways Information Foundation, and to spread the good roads story to friends, relations, and all members of the community.

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CONTRACTORS AND ENGINEERS



28 Free-World Countries Spending \$50 Million or More Annually for Highways\*

# Global Record

	estimated - 1959	forecast - 1960		estimated - 1959	forecast - 1960
United States	\$10,964,750,000	\$11,500,000,000	Finland	\$111,600,000	\$115,000,000
Canada	1,191,710,000	1,350,000,000	Norway	100,009,000	110,000,000
W. Germany	960,000,000	1,000,000,000	Mexico	85,480,000	95,000,000
France	642,600,000	750,000,000	Union of S. Africa	92,500,000	95,000,000
Great Britain	478,550,000	550,000,000	New Zealand	74,257,920	78,000,000
Japan	398,834,800	450,000,000	Argentina	65,406,433	75,000,000
Italy	320,000,000	350,000,000	Philippines	68,709,000	75,000,000
Australia	311,314,200	350,000,000	Yugoslavia	65,000,000	70,000,000
Brazil	200,000,000	250,000,000	Denmark	61,622,400	65,000,000
India	176,750,000	200,000,000	Algeria	50,000,000	60,000,000
Sweden	176,924,000	195,000,000	Cuba	52,030,000	55,000,000
Switzerland	140,040,000	150,000,000	Netherlands	51,412,883	55,000,000
Venezuela	114,582,500	150,000,000	Turkey	---	55,000,000
Austria	105,567,400	120,000,000	Iraq	---	50,000,000

Source: International Road Federation — \* includes construction, maintenance, and administrative costs.

Highway spending in the free world this year will rise an estimated 5 per cent over the 1959 level to reach \$20 billion. The United States—with a 5 per cent increase this year—will account for \$11.5 billion of this total. Outside the U. S., expenditures will rise 11 per cent to \$8.5 billion.

The forecast is based on an International Road Federation survey of 144 countries and territories. The figures include construction, maintenance, and administrative costs.

The expected increases would come on top of a world-wide increase in highway spending during 1959.

The United States established a new record for the eighth consecutive year. The free world spent an estimated \$18.6 billion in 1959, exceeding the 1958 record of \$17.1 billion by 8.3 per cent.

The United States, which invests more in highways than the rest of the world combined, spent \$10.96 billion in 1959—a gain of 10 per cent. The remaining areas surveyed spent \$7.64 billion—a combined increase of 11 per cent.

Over the last eight years, highway spending by the free world has increased 10 to 15 per cent annually, I.R.F. estimates. Should this trend continue, as expected, global highway expenditures will reach \$45 billion between 1965 and 1967.

Sometime before 1963, highway expenditures of the other free countries of the world will equal that of the United States.

Last year, 26 countries reported expenditures of \$50 million or more.

Canada spent \$1.19 billion to rank second behind the United States. West Germany, which ranked second in 1958, cut highway spending 11 per cent to \$960 million—the third high-est outlay last year.

The big percentage gains in 1959 were achieved by the newly developing nations and areas. The Canal Zone, building a new bridge over the Panama Canal, reported an increase of 234 per cent. British Honduras' outlay rose 175 per cent and Jordan's, 150 per cent. High percentage increases were also reported for the Republic of Panama, Liberia, North Rhodesia, Monaco, the Sudan, the Philippines, and Formosa.

Asia led the continents of the world with a 17.3 per cent gain from \$64.4 to \$875.7 million.

North and Central America's outlay rose 10.4 per cent from \$11.25 billion to \$12.43 billion. Africa increased spending 9.5 per cent from \$11.4 million to \$361.2 million.

Oceania's gain of 5.7 per cent raised its spending total in that region to \$387.9 million to \$387.9 million.

Europe's spending rose 1 per cent, from \$3.405 billion to \$3.439 billion. Only South America's spending dropped, but this continent is expected to increase its expenditures by 10 per cent in 1960. This will make the decline of 21 per cent in 1959, when outlays fell to \$475.7 million.

## What DELAWARE does about narrow roads

Delaware decided that the old pavement on six miles of State Route 9 in Kent County was too narrow and dangerous for today's traffic.

Last year, the State demonstrated the ease and economy with which such an objectionable bottleneck can be widened and strengthened with hot-mix Texaco Asphaltic Concrete.

First, the existing road was widened 3½ feet at each side with a 6-inch thickness of coarse-graded Texaco Asphaltic Concrete, as shown by one of the accompanying photographs. Then, for the purpose of increasing the load-carrying capacity of the highway, it was resurfaced completely with the same type of asphalt mix used in the widening operation. Finally, the highway was topped with a dense, fine-aggregate Texaco Asphaltic Concrete wearing surface.

Wherever narrow roads present dangerous bottlenecks, convert them into wider, safer and more durable highways at moderate cost as Delaware did, with hot-mix Texaco Asphaltic Concrete.

If you would like help with a street, highway or other paving problem, our 55 years of Asphalt experience is at your service. Write to our nearest office listed below. Or, if you would like our two illustrated brochures containing helpful information on the various Asphalt pavement types, mail the coupon on this page.

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For more facts, use Request Card at page 18 and circle No. 252



Old, narrow pavement on Delaware's Route 9 was widened 3½ feet on each side with a 6-inch thickness of hot-mix Texaco Asphaltic Concrete.

Laying coarse-graded Texaco Asphaltic Concrete over widened pavement, followed by a wearing surface of fine-aggregate Asphaltic Concrete.





# Surveying Washington

by E. E. Halmos, Jr.



## House committees consider bills involving construction

Attention is now focused on House committee actions on bills that will have great effect on construction.

The Ways and Means Committee began hearings on HR 10491 and 10492, which would revise the tax on gains from sales of depreciable personal property—including construction machinery—to make such gains



subject to taxation as ordinary income, to the extent of depreciation taken previously. Thus, the gains

would be made subject to as much as 75 per cent taxation, instead of the present 25 per cent. The Treasury Department has long contended that present methods of permitting the taxpayer to treat such gains as long-term capital gains is costing Uncle Sam too much money, giving an unfair advantage to the businessman.

Construction-machinery manufacturers lost no time in testifying against an 18-line amendment (HR 9996) to the 1949 Federal Property and Administrative Services Act, which would soften provisions relating to the importation of foreign-made equipment or equipment declared surplus overseas by U. S. agencies. The present law requires a showing that a specific shortage of machinery exists in the U. S. before importation permits can be issued. The revision would make it necessary only to determine that importation would not be injurious to the U. S. economy. Robert P. McKenrick, executive vice president of the Construc-

tion Industry Manufacturers Association, pointed out that there has never been a peacetime construction-machinery shortage, that manufacturers are now operating at only half of their rated \$3 billion annual capacity.

The determined drive of the AFL-CIO Building Trades Unions to knock out secondary boycott bans in labor laws got a fairly friendly reception from the Labor Committee, despite the almost unanimous opposition of employer groups ranging from home builders and the Associated General Contractors to the U. S. Chamber of Commerce. Employers argued that "common site" picketing would make it mandatory for an awarding agency to award contracts only to fully unionized contractors. But Rep. Don Magnuson (D., Wash.), for instance, felt constrained to comment that the building trades were being discriminated against by the ban against site picketing.

The hearings into the highway program by a special subcommittee got off to a dull start, with little fireworks and little real evidence of the eventual direction the probe will take. It was evident that congressmen were out to pin the cost of raising interstate bridges on the Defense Department.

Other Public Works Committee hearings were also under way on the biannual appropriations for federal-aid highways other than interstate (the ABC system). The only question was whether Congress would go along with having ABC funds cut back to \$900 million from \$925 million.

## Large construction items in FAA airport program

More than three-quarters of \$58.8 million for airport aid approved by the Federal Aviation Agency fiscal year 1961 will go for large construction items.

To be exact, 76 per cent of the money will be spent for the construction of runways, taxiways, and paved aprons on most of the 314 airports included in the program. Local project sponsors must match federal funds on a 50-50 basis. The money will be made available to local sponsors after July 1 of next year, under terms of a 2-year program approved by Congress at the last session.

## Vast amount of public works, BuRec projects planned

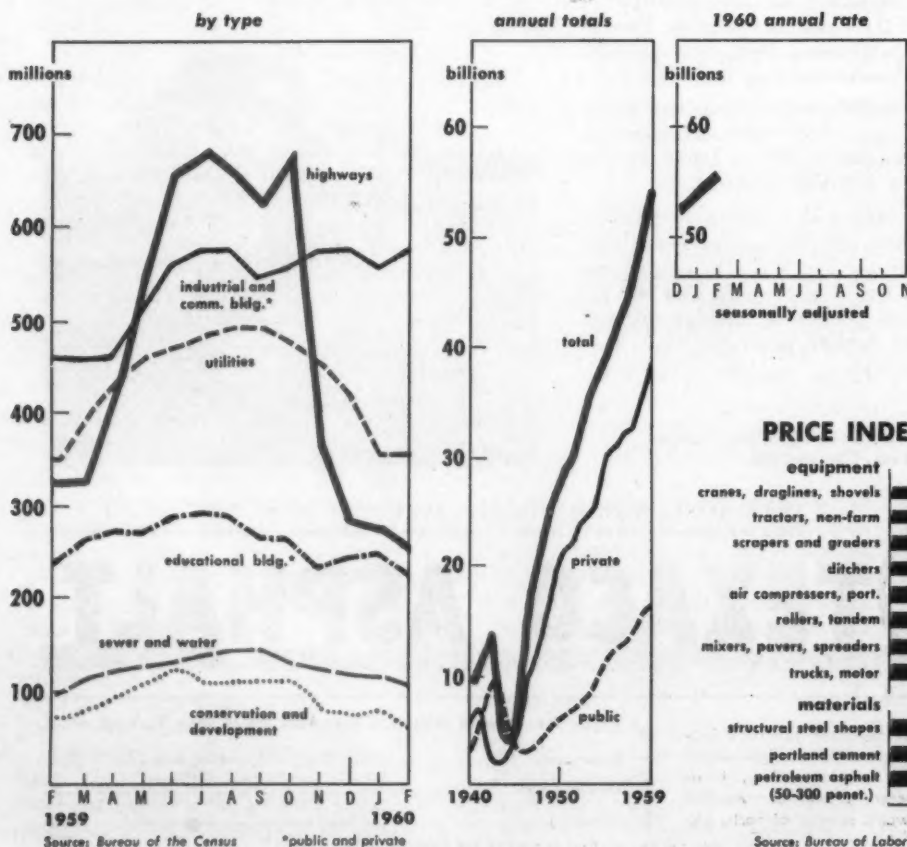
While looking out for new business, don't overlook the vast total of public works now in planning stages in all states. These were sparked under the program of advances for such work authorized in the housing act of 1954. A total of 1,235 such projects—water and sewer systems, schools, highways, hospitals, bridges—were in planning stages or under construction as a result of interest-free loans totaling \$29.4 million at the end of 1959. Community Facilities Administration (part of HHFA) is the loaning agency.

The point is that the government loans are expected to generate construction projects that will cost most 60 times the amount advanced or about \$1.8 billion worth of work. More than half the proposed projects

## Industry Trends

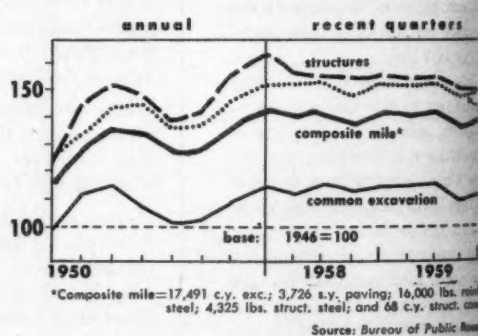
### DOLLAR VALUE OF NEW CONSTRUCTION

Recent Monthly Trends



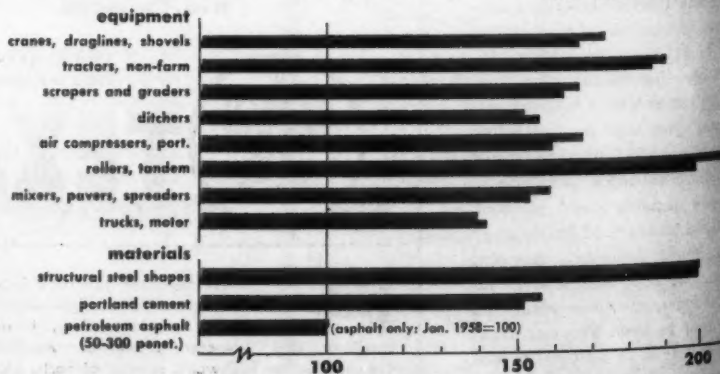
### AVERAGE BID PRICES

Federal Aid Highway Construction



### PRICE INDEX 1947-1949 = 100

JANUARY 1960 YEAR AGO



CONTRACTORS AND ENGINEERS



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the way, are for sanitation work—  
water supplies, and incineration.  
Next biggest total is for schools.  
Heavy-construction contractors will  
get contracts coming through faster,  
the Bureau of Reclamation suc  
cess in its efforts to get states to  
guarantee irrigation repayments.  
Under the first contract of this  
kind, signed recently with California,  
the state guarantees a total of \$13.7  
million in repayments for Black Butte  
and New Hogan dams in the Central  
Valley. The state will collect its  
money from benefited local irrigation  
districts, but meanwhile BuRec can  
proceed with construction work with  
out the long delays usually caused by  
negotiations with a dozen or more  
local entities.

Incidentally, Black Butte and New

Hogan, primarily flood-control proj  
ects, will be built by the Corps of En  
gineers under the recent "jurisdic  
tional" agreement between the Corps,  
BuRec, and the state. BuRec assumes  
responsibility for all irrigation serv  
ices associated with multipurpose  
projects in the Central Valley.

Corps suggests one-shot

appropriations for its jobs

Don't look for any quick approval  
of the Corps of Engineers "sugges  
tion" for "one-shot" appropriations  
for its projects, despite the savings  
that would mean for the government  
and for contractors. Lt. Gen. E. C.  
Schneider, testifying before a Senate  
committee, suggested that at some fu  
ture date Congress should appropri  
ate the total cost of projects at one  
time, rather than by the piecemeal  
year-to-year method traditionally  
followed.

Senators obviously like the idea, but  
are leery of it. A single large proj  
ect, say a \$400 million one, could  
throw the whole national budget out  
of balance. Indications are that the  
lawgivers might look with favor on  
such total appropriations for projects  
that could be completed in, say, a  
year or two.

But the Corps is very likely to get  
another item that it wants badly: the  
authority to survey river flood plains  
and to give official warning to com  
munities, builders, and property own  
ers that certain areas are subject to  
flooding. The implication is that, once  
such a survey and warning is deliv  
ered, it would be hard to get federal  
flood relief.

Bill proposes alternate spex  
for hot-mix, concrete paving

Alternate specifications for asphalt  
and concrete paving would be re  
quired on all federal-aid highway  
projects, under terms of HR 9586 in  
troduced by Rep. Morgan M. Moulder  
(D., Mo.). Nobody gives the measure  
any chance of passage, but the signif  
icant paragraph is interesting: "...  
on all projects... the Secretary...  
shall require plans and specifications  
for alternate construction by port  
land-cement concrete and asphaltic  
concrete of comparable design, and  
contracts for such construction shall  
be awarded upon the acceptance of  
alternate bids in accordance with the  
lowest bid price."

For more facts, circle No. 253→

#### Tax tips on dry states, expense accounts, self-employed

If you live in a dry state, you can't  
deduct costs of liquor used in enter  
taining business prospects from your  
federal income tax, according to a  
U. S. Tax Court decision concerning  
a businessman operating in the state  
of Mississippi.

If you have an expense account and  
are required to submit a detailed  
statement on it to your employer, you  
will not have to submit such a state  
ment with your income tax when it is  
due in 1961. But you'd better keep



detailed records of your own; the In  
ternal Revenue Service has warned  
it may call for such supporting data  
next year.

And if you are self-employed, there  
is still a chance you may get a tax  
break by being permitted to deduct  
payments into a self-supported re  
tirement plan. You may remember  
that last year the House passed a bill  
on the subject—HR 10—which has  
been bottled up in the Senate ever  
since. But there are now some pros  
pects that it might be broken loose  
before the session is over.



SCRAPER-LOADING using a Caterpillar No. 60 Scraper is a job the new D7 handles with ease. New Turbocharged C-6 Diesel delivers 140 HP. Greater torque rise increases its lugging ability 80 per cent.

## TRIPLE PLAY BY NEW D7

Three different tasks and 20 per cent more production



DOZING approaches to Eleven Point Bridge, the D7 aerates heavy, wet earth before compacting and adding more fill. New dry-type air cleaner, lifetime lubricated rollers and new transmission lubricating system make low-cost operation normal for a Cat-built Tractor.



COMPACTING is a job the D7 Series D takes in stride. Final drive gears have been strengthened on the new model and big job-proved features have been retained... such as the exclusive oil clutch which delivers as many as 2000 service hours without adjustment.

All-around performance—dozing, scraping, compacting—makes the D7 Series D an even better investment than the efficient machine it replaced. On this bridge construction job over the Eleven Point River at Dalton, Ark., the approaches had to be cleared and the road widened. Through heavy, wet sand and clay, the new D7 more than lived up to the expectations of Superintendent Farris Whited, Jr., of the E. E. Barber Construction Company, Fort Smith, Ark.: "The new D7 Series D is the best tractor I have ever operated. It can do at least 20 per cent more work than the former model. It loads the scraper fast and hauls and pulls good. In dozing it can really move the dirt, too!"

Ask your Caterpillar Dealer—who sells, services and maintains a complete parts inventory for a full line of equipment—to demonstrate a new D7. You supply the job and name the date. He'll supply the machine and proof of performance. Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

# CATERPILLAR

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**WANTED—  
THE HARD WORK**





Carrying a 19-yard payload, a Michigan Model 210 rubber-tire scraper roars to one of the fills on the 5-mile stretch of U. S. 31W being brought to grade near Elizabethtown, Ky.

## Fast-moving scrapers on tough grading job

handle increase in borrow yardage  
and make up time lost in bad weather

A scraper fleet moving 4,000 yards of earth per 8-hour shift on a grading job on U. S. 31W north of Elizabethtown, Ky., more than compensated for difficulties caused by bad weather and a revision in plans that increased the borrow yardage from 15,000 to 45,000 yards.

Ferguson Contracting Co., Princeton, Ky., was plagued by rains from the start of the contract. In the seven months it took to complete this project, a total of 21.23 inches of rain fell—some 4.43 inches above normal.

Then it was learned that three of the 20 types of soil being worked were unsuitable for the top foot of fill. State and federal regulations required the subbase to be topped with at least 12 inches of material having a CBR of 5.0 or better.

### Swift loading time

Ferguson's spread had to move fast to handle the job. Three new Michigan rubber-tire Model 210 tractor-scrapers, a new Model 280 tractor-dozzer, a sheepsfoot roller pulled by a Cat D7 crawler, and a Cat No. 12 motor grader did just that. Stripping went smoothly and, though the soil was wet, the first cut offered a type of clay that would load and compact. Fast loading was a must to break up the material and keep the scrapers from bogging down.

The Model 280 tractor-dozzer push-loaded the tractor-scrapers in about 40 seconds, boosting them out on their average 1,500-foot hauls at a rate fast enough to average 4,000 yards of earth moved per 8-hour shift.

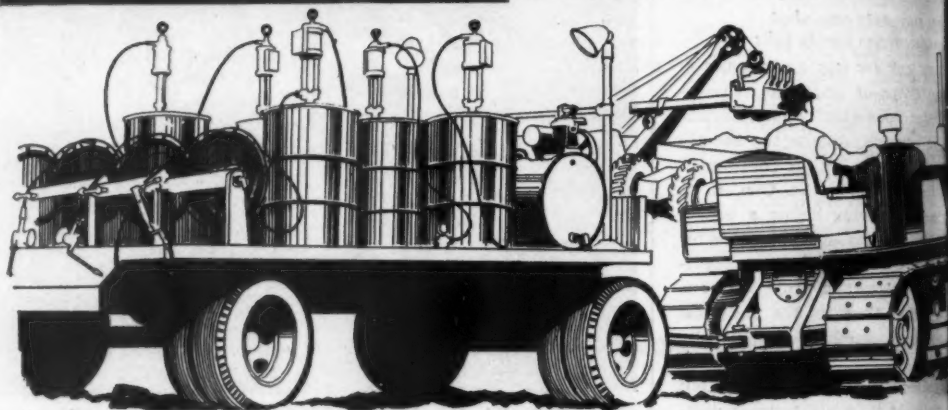
The Model 280 push-loaded at an average of 4 to 5 mph, and backed up at 8 to 10 mph to pick up the next scraper. Under this setup, the scrapers made an average of 12 trips per hour. Where haul roads permitted, the 210's, carrying 19-yard loads, were operated at speeds up to 30 mph.

Hauls reached a mile in length when a special borrow pit had to be set up to provide fill dirt that would meet specifications on one section of the project. But the scrapers' high haul speeds kept production up enough to offset the added cost of this work.

As the job progressed, unsuitable soil classifications turned up when

## LUBE LOGIC

## Tips for mobile



### Do-it-yourself lube rig trailer

Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole simplified lube plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching

it to any truck, so it's just as mobile as a truck moving seals are at much less cost. And here's a bonus: by hitching your rig trailer to a bulldozer, you can take field service to the real during that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your requirements.

TEXACO LUBRICATION ENGINEERS ON THE JOB FROM COAST TO COAST



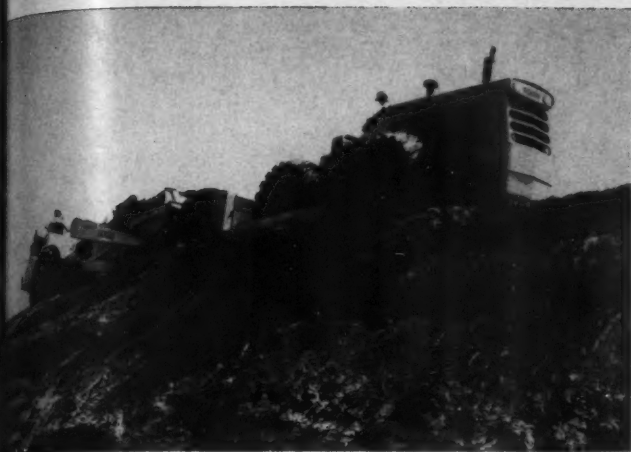
**ROCKY REACH DAM AND POWERHOUSE** on the Columbia River, Washington (above). W. N. Evans (left), Manager for Rocky Reach Contractors, discusses Simplified Lubrication Plan with E. S. Saunders, Texaco Contractor Sales Representative.

**HOOBACK DAM**, Riverton, Conn., (upper right) is part of the greater Hartford water supply system. Texaco man-on-the-job is H. F. Porter (left) shown with John Toffolon, Vice President, White Oak Contractors, Inc., General Contractors.

**INTERSTATE HIGHWAY 80 PROJECT** at Colfax, Iowa (right). Texaco Engineer E. A. Howles (right) works closely with Mott Construction Company on the important assignment of keeping equipment on the job and maintenance costs low.





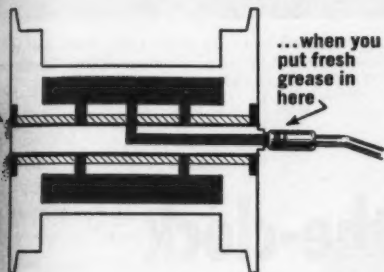


Another of the tractor-scrapers is push-loaded by a Model 280 tractor dozer. Scrapers handle 4,000 yards of material per 8-hour shift on this contract. Scrapers get their loads in about 40 seconds.

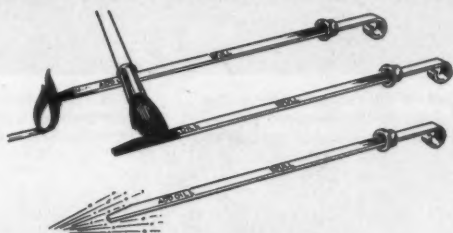


This Michigan 280 poured on the speed to handle its work on the grading project. Part of the job included construction of a trench drain in a cut where the contractor encountered sand.

## Efficient maintenance



...when you put fresh grease in here

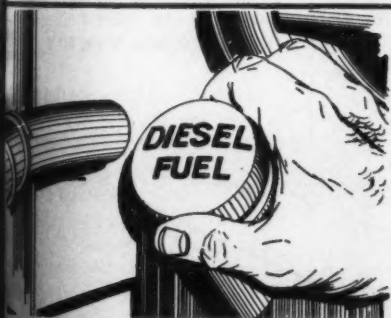


### How to read dipsticks without squinting

The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube bay.)

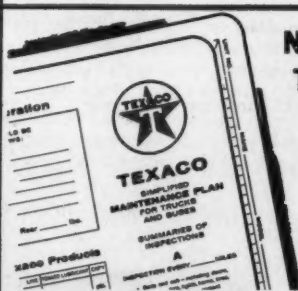
### Track-roll enemy No. 1: sand

If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Track-roll bearing seals are especially designed for this type of purging operation, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.



### Identify the fuel you want

An absent-minded maintenance man put gasoline in a diesel tank and as the fliers say "you'll be bailing out Denver." It's happened. Best way to avoid its happening to you is to mark your fill cap "Diesel Fuel" or "Gasoline." Then nobody should make any mistakes.



### NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Write for your folders today.

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Texaco Inc., 135 East 42nd Street, New York 17, N.Y.

For more facts, use Request Card at page 18 and circle No. 254

the top foot of fill was being placed, and more borrow pits had to be opened.

#### Uncover sand

Another problem cropped up in a cut about 16 feet deep and 600 feet long. The material here consisted largely of an oozing plastic red clay, but as it was being excavated, a 40-foot-wide×550-foot-long vein of highly absorbent, powdery sand cropped out. It lay at about a 30-degree angle, sandwiched between layers of clay.

The job here was to bring the cut down to grade, then figure out a way to cope with the drainage problem created by the sand.

The plastic clay was removed by scrapers push-loaded by the tractor-dozers, which worked alternately at opposite ends of the cut. Fills were worked almost simultaneously on both sides of the hill.

#### Trench drain

The powdery sand was then brought down to grade, and the entire 600-foot-long section was undercut 2 feet so that it could later be backfilled with a high-grade borrow.

A V-shaped trench drain was then cut down the center of the sandy portion and filled with No. 3 crushed stone. An outlet finger was constructed at a 45-degree angle to the main drain to permit water to runoff to the outside of the berm. This entire operation was done without a significant drop in earthmoving production time because it was handled when other areas were considered too wet to be worked.

THE END

### Armco Drainage builds new Oregon plant

A new \$500,000 plant to produce corrugated-metal pipe will be built at Hillsboro, Ore., by Armo Drainage & Metal Products, Inc., Middletown, Ohio. It will be the company's largest facility on the West Coast for producing corrugated-metal pipe. The 41,000-square-foot facility is located on a 16-acre tract.

The new plant will replace the present one in Portland, Ore.

Andrew Bjorge, head of the Portland plant, will be in charge of the new one.





Seven gantry cranes—6 Americans and the Washington in the foreground—handle the more than 3,000 yards of concrete being placed daily for the Niagara powerhouse near Lewiston, N. Y. The cranes, with 150-foot booms and 65-ton capacities,

work on three levels along the 2,000-foot-long excavation. Rock was left at an elevation of plus 298 feet along the river during excavation of the 400-foot cliff to form a natural cofferdam; the river is at about elevation plus 250 feet.

## More than 3,000 yards of concrete placed daily for Niagara powerhouse in . . .

by TONY MAVROUDIS, field editor

## Round-the-clock concrete operations

Over 3,000 cubic yards of concrete is being placed around the clock for the \$99 million Niagara generating plant—the main unit of the \$700 million Niagara Power Project at Niagara Falls, N. Y.

Located near Lewistown, N. Y., a few miles north of and downstream from the famed falls, the plant is being built into the face of a 400-foot cliff by Merritt-Chapman and Scott Corp., New York, N. Y.

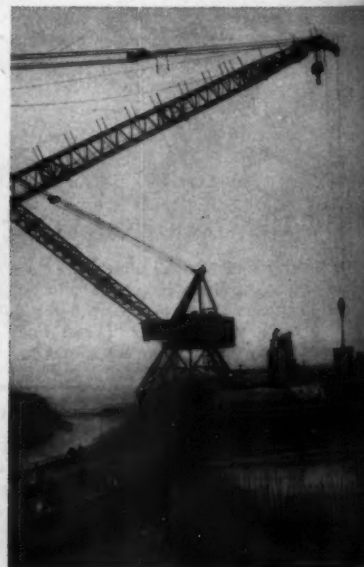
(Additional photo on front cover)



An aerial view of the work on the powerhouse shows the relative locations of the Lewiston bypass road, the upper and lower batch plants serving the gantries, and the beginning of the open-channel excavation.



A Plymouth locomotive heads out on the trestle pulling four Gar-Bro 4-yard concrete buckets on a flatcar. This fully automatic C. S. Johnson plant is equipped with three Koshring 4-yard mixers.



The long booms of the Americans are kept busy swinging buckets to the concrete crews. Steel forms are being used for this pier and other cantilever work, plywood-faced timber for transition areas.

CONTRACTORS AND ENGINEERS

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APRIL, 1960





C&S is operating a prestressing yard at the spoil bank to produce post-tensioned beams to support Lewiston Road and the proposed Niagara Parkway. Concrete is going into the Blaw-Knox steel forms.



The B-K forms are not dismantled; a contractor-built overhead gantry uses a specially built spreader beam to pick up a length of side forms for positioning. The gantry also lifts and stockpiles prestressed units.



A manual hoist is used to handle placement of the hydraulic jack during post-tensioning of the beams. The pump is mounted on a stand that can be moved around the casting site by an overhead crane.

#### Excavation ends

M-C&S has almost removed the remaining 9,750,000 cubic yards of excavation, with the exception of a massive, natural cofferdam wall at the base of the escarpment and a temporary road plug through the escarpment. During the excavation phase of the project, which got under way in the spring of 1958, the contractor concentrated operations on two locations.

The powerhouse area was carved out as crews cut a series of huge benches down the escarpment along a 2,000-foot stretch. (See "Benches Carved from Cliff to Seat Niagara Powerhouse," C&E, May, 1959, page 4.) This work involved the removal of 6,700,000 yards of material. The second operation was the construction of the forebay area, which required over 2,360,000 yards of excavation. This 1,000-foot-long forebay was formed adjacent to the intake structure at the top of the escarpment.

The benching, which involved drill-downs, blasting, digging, and hauling at the various levels, began at the top, at elevation plus 575 feet, and continued until the crews reached the base of the cliff, at elevation plus 208 feet.

M-C&S left the existing rock along the water line of the Niagara River at elevation plus 298 feet to form a natural cofferdam; the river level is about plus 250 feet. This allows concrete work on the powerhouse base to be done in the dry. After it is completed, the rock cofferdam will be removed.

Two of the seven gantry cranes erected to handle the concrete work are on rails laid along the inside face of the natural cofferdam at elevation plus 208 feet.

#### Gantries ride trestles

In addition to the pair of gantries at the base of the excavation, M-C&S has erected two trestles—one at elevation plus 560 feet and one at plus 500 feet—to support the other gantries working across the powerhouse area. The top trestle, at an elevation that roughly coincides with the existing Lewiston Road, supports two gantries; the lower trestle supports one.

(Continued on next page)

## All new for '60— ATECO RIPPERS for INTERNATIONAL CRAWLERS

**ROOM FOR A WINCH!** New ATECO Rock Ripper for TD25 available with offset tool beam; leaves plenty of room for double-drum winch so you can use cable-operated dozers, etc.



**ALL NEW ATECO's** line of performance-proved heavy duty rock rippers for International tractors offer profit-making advantages on any earth or rock moving job.

Teamed up with a dozer or skid shovel, they provide perfect balance for increased traction and higher performance, ripping or earth-moving.

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the tough jobs the world over. Compare ATECO in every detail... the pioneer in tractor-mounted rippers. You'll find they're huskier, built to last longer, deliver more work with less downtime.

They're extra versatile, too. Complete range of models (to 72" ripping depth), shanks, wingfoot boots, cable-laying attachments, etc. available.

**PERFECTLY-BALANCED TEAM!** ATECO Ripper and DROT Skid-Shovel on this TD20 make a high-production combination you can't beat for moving rock, shale, other hard-to-load materials. Perfect weight distribution improves traction and performance.



Only ATECO Rippers have world-wide acceptance!

Make your International an all-around profit-maker with ATECO's new ripper. Available for TD14, TD15, TD18, TD20, TD24 and TD25. Prompt delivery. Write or wire for literature, prices. East and West deliveries.

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Aggregates are stockpiled by an overhead conveyor that has a row of spray nozzles to cool the material. Stone goes from the reclaiming tunnel to washer screen, then to the cooling conveyor with refrigerated spray, dewatering vibrating screen, and the transfer tower before going to batch plants.

(Continued from preceding page)

At each of the trestle elevations is a batch plant that supplies concrete to the gantries. The top of the natural cofferdam is used as a haul road to supply concrete from the lower batch plant to the base gantries. Converted International Payhaulers, originally used to haul the rock excavation, now shuttle the 4-yard concrete buckets over this haul route.

Both drive-through-type batch plants load the Gar-Bro concrete buckets that are hauled onto the trestles by Plymouth locomotive-drawn flatcars. There are two tracks on each trestle running between the gantry rails. The seven gantries—six Americans and one Washington—have a 65-ton capacity and 150-foot boom to handle all the lifts and concrete placement on the river side of the plant.

The contractor had to use three gantry levels and two concrete batch plants on this phase of work because of the height of the project and the long front-to-back distance between the upper intake structure and the plant discharge.

#### Batch plants

The upper C. S. Johnson batch plant, supplying the two top gantries, is equipped with three Koehring 4-yard mixers, a 1,100-cubic-yard aggregate bin, two 5,846-barrel cement silos for portland cement, and one 4,753-barrel cement silo for natural-cement storage.

The lower Johnson plant is similar to the top plant, but it has two 1,000-barrel cement silos—one for portland and one for natural cement storage—and a 500-cubic-yard aggregate bin.

Water for the plants—and for curing purposes—is supplied by a 200,000-gallon elevated tank at the top of the escarpment and a 200,000-gallon tank on the ground near the lower plant. Both plants are interconnected and are supplied by one aggregate-stockpiling setup located north of the upper plant.

#### Aggregate storage

M-C&S is stockpiling  $\frac{3}{4}$ , 1½, 3, and 6-inch stone and sand as it is delivered from the main aggregate plant supplying all Niagara power contractors. The different sizes of stone and sand are dumped into a ground-level hopper that feeds an overhead stockpiling conveyor.

A reclaiming tunnel beneath the stockpiles houses a pair of 36-inch conveyors that are charged by electrically operated feeders under each pile. One conveyor picks up sand while the other handles stone.

The stone is then dumped onto another conveyor running at right

angles to the reclaiming tunnel. The belt carries the stone to a vibrating washer screen before it is passed to the cooling conveyor. This conveyor is parallel to the reclaiming conveyor and is used to cool off the aggregates before they are charged to the bins for the batch plants. The cooling is necessary because of a requirement that the concrete mix must be no warmer than 60 degrees F when it is placed.

Cooling is accomplished by spraying refrigerated water onto the stone as it passes by. The cooling conveyor dumps the stone into a dewatering vibrating screen to separate the water from the stone.



## The New Earth-Mover 40% Stronger—only 6% Heavier

Today's earth-movers are carrying bigger loads than ever—and moving them faster, too.

To meet the added strain imposed on rims, Goodyear, long-time leader in rim development, has introduced a complete new line of Earth-

Mover Rims. Although 40% stronger, these rims are only 6% heavier.

With Goodyear rims you enjoy such added strength as a heavy-duty bead seat band designed to prevent slipping under severest operating conditions.

Buy and Specify RIMS by

# GOODYEAR



menel. The stone is then picked  
vibrating and raised to the transfer tower,  
passed where the reclaiming sand conveyor  
conveyors terminates.

The contractor has also installed  
regates by row of spray nozzles beneath the  
he bins overhead stockpiling conveyor that  
ng is continuously spray the stockpiles. This  
ment the water evaporates and provides some  
no mauling of the aggregates before they  
is placed reclaimed. All the belts used are  
by spray inches wide and were supplied by  
to the B. F. Goodrich Co., Akron, Ohio.  
the stone. Both the sand and stone conveyors  
veyor from the reclaiming tunnel and cool-  
newwatering setup feed into the transfer tower,  
the water which is equipped with a 2-way chute.

This C. S. Johnson plant supplies the two  
gantries working from the top trestle. This  
plant has three Koehring 4-yard mixers, a  
1,100-yard aggregate bin, two 5,846-bar-  
rel cement silos for portland cement, and  
a 4,753-barrel cement silo for natural ce-  
ment. In the background are aggregate  
stockpiles for plants at both trestle levels.

From here, the aggregates are trans-  
ferred by other conveyors to the upper  
or lower batch plants.

Cement, delivered to the upper  
plant site in bottom-dump rail cars,  
is dumped into a hopper feeding a  
Fuller-Kinyon cement pump. The



## TODAY'S MASSIVE LOADS



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for lasting protection  
against rust and corrosion

And you get the positive air seal  
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Goodyear makes rims in widths up to 37" and  
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rims job-fitted by Goodyear. See your local rim  
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Send for Free Goodyear Rim Catalog  
—84 pages of facts and pictures on Goodyear's  
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# GOODYEAR

More tons are carried  
on Goodyear Rims  
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pump transfers the cement at a rate  
of 400 barrels per hour to the cement  
silos of the upper plant. From here,  
the cement is fed to the lower plant  
by another Fuller-Kinyon cement  
pump and an 8-inch air slide.

Both plants, fully automatic, have  
an electrically operated system ac-  
tivated by push-button controls.

### Concrete placement

The contractor is using both pre-  
fabricated steel forms and timber  
forms fabricated on the job. Most of  
the cantilevered work, such as pier  
noses, is formed with the steel forms;  
the draft tubes and other transition  
areas are formed with timber faced  
with plywood. Concrete surfaces that  
will be left exposed are being formed  
with steel units lined with plywood  
sheets. The bulk of the mass con-  
crete placement is held to 5-foot lifts,  
and most of the curing is being done  
with water. Curing compound is some-  
times required on surfaces that can-  
not be kept wet. Curing time on the  
project varies because of the many  
different types of placement being  
made.

### Prestressed beams

M-C&S is also producing 26,700  
linear feet of prestressed-concrete  
beams and 12,100 linear feet of cast-  
in-place diaphragms that will support  
the existing Lewiston Road and the  
proposed Niagara Parkway across the  
top of the intake structure of the  
powerhouse.

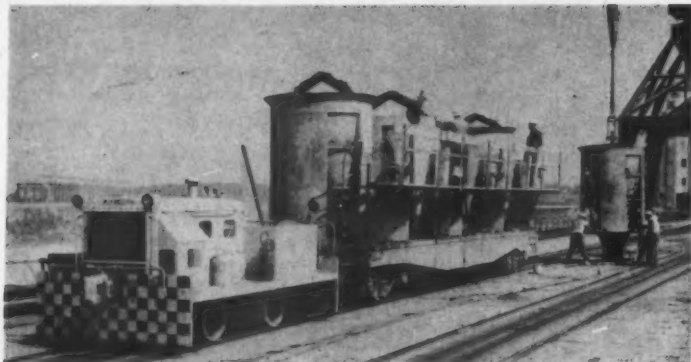
The prestressing yard, set up at the  
project's huge spoil area to produce  
these prestressed-concrete beams, is  
equipped with casting beds straddled  
by a contractor-built gantry. The  
gantry handles the moving of the  
Blaw-Knox steel forms from casting  
bed to casting bed and also stock-  
piles the post-tensioned beams.

Concrete is delivered to the pre-  
stressing yard from the lower batch  
plant in agitating truck bodies that  
dump directly into the forms.

### Generating plants

When completed in 1962, the Ni-  
agara generating plant will consist  
of an intake structure at the top of  
the escarpment and a power plant  
at the bottom, the two connected by  
concrete-encased steel penstocks.  
Each penstock will be 24 feet in di-





ameter and about 480 feet long. Thirteen generating units, each of 187,000-kva capacity, will be installed in the reinforced-concrete powerhouse.

The remotely controlled Plymouth locomotives used by M-C&S spot concrete cars for the gantries to speed the concrete work. The compact-sized diesel-hydraulic units carry four of the Gar-Bro 4-yard buckets.

(Continued from preceding page)

The plant will have a permanent 630-ton-capacity gantry crane to handle the turbine and generator assemblies; a 30-ton gantry crane to handle the intake gates. The initial installed name-plate capacity of the Niagara plant will be 1,800 kw; with the 12 generator units of the Tuscarora plant producing 240,000 kw, the total name-plate capacity for the entire Niagara Power Project will be 2,190,000 kw.

#### Personnel

Merritt-Chapman construction operations on the Niagara generating plant are under the supervision of G. Werner, Jr., vice president. R. Senn, the project manager, heads the field staff, which includes F. Jones, general superintendent; C. Mason, project engineer; R. C. Lo, office manager; W. L. Olsen, assistant project engineer. William Deming, executive vice president of M-C construction department, is in overall charge of construction on Merritt's two jobs on the Niagara Project.

William H. Latham is the resident engineer for the New York State Power Authority, and J. P. O'Brien, the project manager for Uhl, Hall, Rich, Boston, Mass., the consultant for the Authority.

#### Iowa highway commission names new division heads

The Iowa State Highway Commission has appointed three engineers to head the three major divisions: engineering, planning, and service. R. M. Tutton will temporarily head the Division of Engineering. Carl Schach heads the Division of Planning; and James F. Hoag, the Division of Services.

New duty changes make W. L. Wickham construction engineer; Steiner Silence, District No. 1 engineer; Stephen E. Roberts, research engineer; Ralph D. Cornick, assistant district engineer in District 3, Sioux City. Paul H. Ferleman and Donald D. Campbell are division maintenance engineers at Davenport and Creston respectively.

Donald L. Smith is now assistant district engineer at Sioux City; Richard F. Mumm, materials engineer; Boyd I. Young, materials engineer in District 1, Ames; Donald A. Anderson, soils engineer.

Keith Davis is assistant administration engineer in the main office at Ames. I. J. Anderson is assistant district engineer on maintenance at Council Bluffs; P. G. Kratzke, engineer in the Ames materials department office; A. I. George, assistant district materials engineer at Council Bluffs; Ken Meyer, division maintenance engineer at Forest City; J. Sanders, acting resident engineer at Red Oak; Bill Buss, division maintenance engineer at Grinnell; Chuck Clemens, division maintenance engineer at Cedar Rapids.

## The Cat No. 12 Motor Grader: Tops in its class on any road!

No matter what the type of road or road work, you can count on top performance at low operating cost from a No. 12. On country roads and cross-country highways, this rugged machine has earned its reputation as "The Standard of the Industry."

Here, for example, a No. 12 is working on a stretch of interstate construction near Buchanan, Virginia. Says Superintendent Robert O. Shook of the Nello L. Teer Company, Durham, N. C.: "From my experience with various motor graders I am convinced that the No. 12 is tops in its class. We can get more work out of a No. 12 because it gives us less maintenance trouble—it stays on the job with a minimum of down time. We also get excellent service from our Caterpillar Dealer."

Many factors make the No. 12 a big producer. Here are some:

**MECHANICAL CONTROLS** (standard) provide precise adjustment, reduce kickback, ease engagement. "Anti-creep" lock makes blade stay put under load.

**UNEQUALED VISIBILITY** results from the No. 12's dash-mounted lift gears and low frame design. While seated, the operator has an unobstructed view of the critical areas at the front wheels, toe of blade and circle.

**EXCLUSIVE OIL CLUTCH** provides up to 2,000 hours' service without adjustment, the equivalent of about 12 months of "adjustment free" operation. Virtually eliminates down time for clutch repair.

**OPTIONAL AUTOMATIC BLADE CONTROL** is an attachment that cuts grading time in half. Operator sets desired slope on dial and only has to control depth of cut. Now transistorized for freedom from maintenance and adjustment, the unit automatically maintains blade slope within  $\frac{1}{8}$ " in 10'. Fine for all types of grading.

See the improved No. 12 at your Caterpillar Dealer. Whatever the job, he has the right capacity motor grader for it. Besides the 115 HP No. 12, there's the big new 150 HP No. 14 and the 75 HP No. 112. Ask for a demonstration.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

# CATERPILLAR

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LESS DOWN TIME,  
MORE PRODUCTION...  
CAT MOTOR GRADERS



## Labor Review

### Operating engineers strike surveyors' bargaining rights; NLRB orders 'cease and desist'

An attempt by Operating Engineers Local 12 to organize surveyors in the Los Angeles area by striking the nonunion surveyors was blocked by a National Labor Relations Board finding that such tactics violate the Taft Act. The Board made the ruling in an unfair-labor-practice case brought by the Tri County Association of Civil Engineers and Land Surveyors, an employers' association. Local 12 has been seeking recognition as bargaining agent for surveyors employed by association members.

As part of its campaign, the local called its members off the jobs of the firms doing work for two land-development companies, which, in turn, contracted for the services of the surveying companies. A fifth truck builder was also in the land-development business and held a contract directly with one of the surveying firms.

The union justified the strikes by claiming that the construction companies violated a provision in their collective-bargaining agreements that subcontractors must comply "with terms not less than those contained therein." Presumably, the agreements included pay rates for surveyors, since the board notes that "for comparable classifications of employees, wage rates paid by [the surveying contractors] for surveyors were appreciably lower than those prescribed by the respondent's contract."

The board pointed out, however, that the surveying employers were not subcontractors of the four firms doing work for the land-development companies. Strikes against these firms were illegal (under 8 (b) (4) (A) and (B) of the Taft Act) in that they were intended to induce the construction companies to cease doing business with the land developers, who, in turn, would be induced to cease doing business with the surveying companies—the union's ultimate objective being to obtain recognition as agent for the surveyors.

### Baton Rouge contractors sign 2-year agreements with three more crafts

Associated General Contractors' Baton Rouge chapter wrapped up 2-year agreements with the carpenters and bricklayers, and a one-year agreement with the millwrights.

The settlements closely follow the 1960 agreements in the area signed recently with the plasterers, laborers, and cement finishers. AGC's contracts with operating engineers and lathers were still under negotiation.

Under the carpenters' agreement, rates go up 5 cents hourly to \$3.17½ immediately, with another 5-cent raise due July 1, 1961. Bricklayers get one-shot 2½-cent increase, bringing the hourly rate to \$3.85.

Millwrights, under the only one-

year agreement accepted so far in Baton Rouge, get an immediate 10-cent raise to \$3.50 hourly.

### Southern building tradesmen gain over-the-year average of 12.8 cents hourly during '59

Organized building tradesmen in southern cities gained an average 3 cents an hour during the final three months of 1959, according to the Bureau of Labor Statistics' quarterly survey of wage rates for seven trades in 28 cities.

About one-third of the workmen covered by the survey got raises during the quarter, BLS reports, with

average rates ranging from \$1.84 for building laborers to \$3.78 for bricklayers. Carpenters average \$3.19; plasterers, \$3.38; plumbers, \$3.51; electricians, \$3.52; and painters, \$2.95.

Over-the-year increases averaged 12.8 cents an hour and ranged from 9 cents for building laborers to 15 cents for carpenters. Electricians negotiated an average 14.4-cent raise; painters, a 13.1-cent raise; and bricklayers, a 12.0-cent raise.

### Gray resigns AFL-CIO post for reasons of health; colleagues are surprised

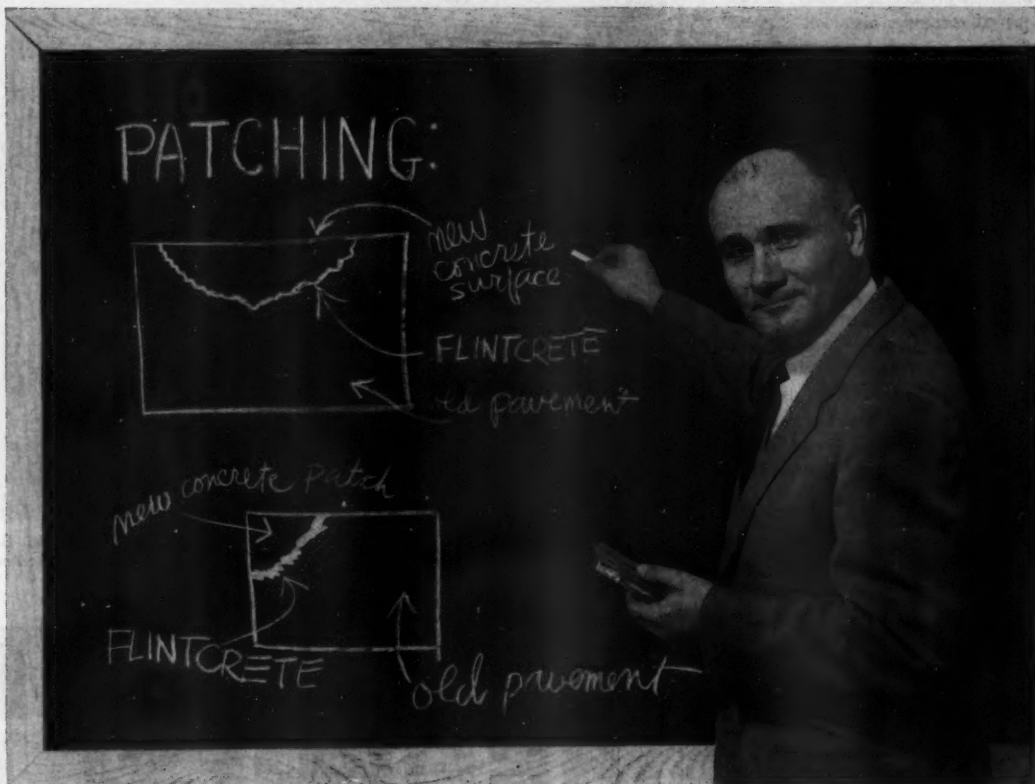
Richard J. Gray resigned as president of the AFL-CIO Building and Construction Trades Department. He

said he was giving up the post he had held since 1943 for health reasons. Gray is 73 years old.

Gray's action came as a surprise to his colleagues. Reports from Miami indicate that he gave no hint he would step out, until after the executive board meeting had been concluded. The resignation was effective March 1.

Several people have been mentioned for Gray's successor, including Lloyd Mashburn, former Undersecretary of Labor and now general president of the Lathers Union, and James L. McDevitt, director of the AFL-CIO Committee on Political Education and a building tradesman who had formerly served as president of the Pennsylvania Federation of Labor.

Chalk talk by paving specialist "Bob" Snyder on Flintcrete—  
Flintkote's amazing new polysulfide/epoxy bonding compound...



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"This extremely high bonding strength really pays off when you're preparing existing concrete surfaces for repair. It's not necessary to remove the slab; only the unsound area need be cut away. And be certain you use a quality compound—the right one for the job at hand."

### Flintcrete can be used for a wide range of other jobs too:

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- bonding precast materials, markers, refractory brick
- skid-proofing pavements • surface sealing

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For more facts, use Request Card at page 18 and circle No. 258





Contractors start excavation, dredging, hauling, compaction for

## A \$133 million leved for

This is part of the 21,800 feet of earth levee that, with 35,600 feet of concrete floodwall and a number of pumping stations, will protect St. Louis from Mississippi floodwaters. Here, in the northern part of the city, hydraulic dredging has deposited sand for the levee.

It's going to take a lot of work to keep Ol' Man River away from St. Louis' door. In fact, it will take about nine years of work and \$133 million to pay for it.

Construction on the giant flood-protection project is already in full swing. Big dredges are sucking sand out of the bottom of the Mississippi and spewing it out on the bank to build massive levees. Trucks are trundling in loads of clay to blanket the riverside slope of the sand fill. Men and machines are making alterations to the city's sewers at locations where the flood-protection works cross over them.

Dirt started flying in April, 1959, when Mary Construction Co., Cape Girardeau, Mo., went to work on an \$623,000 contract to build 4,600 feet of the levee. In August of that year, LaCrosse Dredging Co., Chicago, was awarded a \$1.4 million contract on an 8,700-foot adjoining section.

This work is now well along. Mary Construction Co. expected to finish last month, and LaCrosse is scheduled to complete its work in April of '61.

A \$458,000 contract was also awarded to Massman Construction Co., Kansas City, Mo., in December, covering about 4,000 linear feet of river fill and stone bank-protection work. This is being done to provide sufficient base width for future concrete-floodwall construction riverward of the existing railroad tracks.

Fruin-Colnon Contracting Co., St. Louis, Mo., was awarded a \$240,000 contract in January of this year for replacing approximately 250 linear feet of the existing masonry-arch Baden Sewer with a triple 9x16-foot concrete box-culvert sewer. Construction of the entire project is under the supervision of the St. Louis District of the U. S. Army Corps of Engineers.

### Submerged discharge line

The dredging on Mary Construction Co.'s contract is being handled in an unusual way. The discharge line from the dredge rests on the river bottom for about 1,250 feet of its length so that it does not interfere with heavy boat traffic. The 18-inch cutterhead dredge works from the far side of the river while barges pass over the submerged line. The placing of 650,000 cubic yards of hydraulic fill is being done by Missouri



879-B FINISHER—universal machine for profitable use on any size finishing job.

# No. 1 FINISHER IN BROADEST CHOICE

Four finishers, road widener are sized for every need; each a class topper for lowest cost dependable performance

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Big reasons why each machine tops its class for performance and values are: lowest paving cost per ton; highest quality construction of all type mixes with compaction before strike-off; denser mat minimizes rolling time; superior hopper design cuts hand labor; operators' preference increases productivity; and world's finest parts and service support.

This brief introduction shows why these five machines match every finishing need:

**879B FINISHER**—Universal machine for contractors wanting greatest job range from a single finisher.

**SA-60 FINISHER**—World's largest, fastest, most

powerful finisher on tracks—lowest cost per mile for contractors with highest capacity jobs.

**SB-60 FINISHER**—Same as SA-60 except it runs on rubber tires for even greater maneuverability and portability.

**873 FINISHER**—For the small or large contractor with a wide variety of small, scattered jobs. Works on tracks, travels on rubber.

**SJ-50 ROAD WIDENER AND PAVER**—Only machine that handles all types of widening and shoulder paving with all materials, including concrete. Exclusive tamping-leveling attachment for asphalt paving.

See your nearby distributor for the demonstration difference in a Barber-Greene finisher or road widener, the asphalt paving machines that have been best sellers since 1938.



The discharge from the dredge is directed into the location for a levee, where a Michigan 280 rubber-tire dozer spreads the material. Water flows to a wood flume, then back to the river.



## Levee for St. Louis



**FINISHER**—world's largest finisher on rubber delivers lowest cost mile on your biggest jobs. SA-60 identical except crawler mounted.



**873 FINISHER**—Only small track-mounted finisher, travels on rubber to handle scattered jobs most profitably.

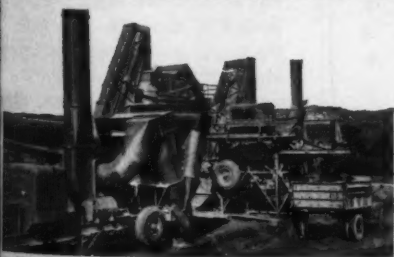


**SJ-50 ROAD WIDENER-PAVER** handles all types of widening and shoulder paving with all materials, including concrete.

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VEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

April, 1960

Dredging Co., St. Louis, under a sub-contract.

The section of the levee now under construction is located on the river-bank about 5 miles north of downtown St. Louis. From here, the protection system will extend 3 miles upstream and about 8½ miles downstream.

### Protection system

The over-all project, authorized by Congress in 1955, includes construction of 21,800 feet of earth levee and 35,600 feet of concrete floodwall. The earth levees are generally at the northern end of the project, where there is sufficient room for their broad base. In the more congested downtown areas, concrete floodwalls will be built.

The levees and floodwalls will protect the city from high waters of the Mississippi. Additional protection is needed to prevent flooding by drainage waters on the city side of the levee. Flooding is caused by the backing up of storm sewers that do not have sufficient pressure to discharge into the high-level river. Surface drainage water also builds up on the city side of the levee. Storm-sewer and other drainage water has to be put under pressure to get it into the river. This is done by building pumping stations that will pick up the storm and sanitary flow from the city side and pump over the top of the levee and out to the river.

### Interior drainage

Providing for the interior drainage is a large and complex job. In fact, the construction to take care of the drainage will account for about half the total cost of the project. The plans call for 21 pumping stations, 16 pressure-interceptor sewers, and 21 low-level collector sewers. The work also includes the pressurizing of 7 existing sewers.

The drainage system combined with the levees and floodwalls will protect a 3,160-acre heavily industrialized river-front area, and an 800-acre area, relatively undeveloped, against a flood of about 200-year frequency. The system is designed to withstand the equivalent of the all-time record flood of 1844.

During the past year, most of the work has been concentrated on the levee construction at the north end of the project. Here, the hydraulic

For more facts, circle No. 259





This Cat D7 spreads clay dumped by the Gar Wood 10-yard body on the White truck so that it can be compacted for the 5-foot-thick impervious blanket on the river side.



Five contractors position a 60-ton steel roof—all five use Lorain Moto-Cranes for the job.

## LEAVE IT TO LORAIN . . . to build the first rubber-tire crane 41 years ago . . . to develop more sizes and introduce more innovations than any other manufacturer

**First with crane carriers** especially built for crane service to provide unlimited speed (up to 45 mph) mobility . . . to do a job no commercial motor truck chassis can do.

**First with Square-Tubular-Chord booms** that are lighter, stronger . . . increase lifting capacities and provide greater reaches for clamshell and dragline service. Available up to 200-ft., plus 40-ft. tip.

**First with "Shear-Ball" connection** that provides smooth, steady swings . . . reduces downtime for maintenance and frequent lubrication common to roller type designs. "Shear-Ball" is warranted for 10 years.

**First with "Power-Set" outriggers** that are set in less than one minute. Four independently controlled, hydraulically operated outrigger beams automatically adjust to uneven ground or for tight quarter work.

For details, see your Lorain distributor.

**THE THEW SHOVEL COMPANY, LORAIN, OHIO**

### Wide range of models available

Model No.	Crane Capacity	Shovel Capacity	Carrier	Clam	Drag	Hoe
TC-107	8-ton	¾-yd.	6x4, 6x6	x	x	x
TC-110	10-ton	½-yd.	6x4, 6x6	x	x	x
MC-218	18-ton	¾-yd.	6x4	x	x	x
MC-425	25-ton	1-yd.	6x4	x	x	x
MC-430	30-ton	1-yd.	8x4	x	x	x
MC-530	35-ton	1-yd.	6x4, 8x4	x	x	x
MC-530W	35-ton	1¼-yd.	8x4	x	x	x
MC-760	65-ton	—	8x4	x	—	—
MC-875	80-ton	—	6x4	x	—	—

# LORAIN. ON THE MOVE

For more facts, use Request Card at page 18 and circle No. 260

(Continued from preceding page)

levee is blanketed on the river side with a 5-foot layer of impervious clay, and on the city side with a 1.5-foot layer of topsoil. The sides of the levee drop down from a 20-foot crown on gentle 4 to 1 slopes to a 40-foot impervious berm on the river side and a 50-foot sand berm blanketed with 1.5 feet of topsoil on the city side. The part of the levee now being built averages about 10 feet wide at the base, with a height above natural ground of about 10 feet.

### Boat traffic causes problem

On Mary Construction Co.'s contract, the sand to build the levee is located on the far side of the river. The shipping channel is on the river side. Under ordinary methods, the discharge line from the dredge would have to be disconnected every time a ship went up the river. Missoua Dredging Co., however, decided to eliminate the stop-and-go dredging by sinking the portion of the line that crossed the channel.

The 1,250 feet of submerged line was built of lengths of 18-inch pipe. These were welded together at the bank and the forward end of the line was pulled into the water. The Mobile Pulley ball-and-socket joints were set at intervals in the line to give the pipe flexibility. Three anchors held the line against the force of the 5-mph current.

### Booster pump on line

On the river end, the submerged line elbowed up to a junction barge where it connected to the floating section of the discharge line. In the latter stages of the work, a booster pump was put on the line at this point. The 18-inch Fairbanks Morse pump was driven by a Baldwin 1,750-hp diesel engine.

The floating line led from the junction barge to the 18-inch cutterhead dredge, St. Louis. The main pump at the dredge was driven by a General Motors 540-kw 1,500-hp electric motor. A Baldwin 1,750-hp diesel electric unit furnished the power for the electric pump motor.

The high-powered dredge moved 400 cubic yards of sand per hour through about 2,800 feet of line at a 44-foot lift. The production was steady, however, because of the hard digging. Submerged logs and even rock bottom were a constant hazard.

On the discharge end of the line

**CONTRACTORS AND ENGINEERS**



Where the levee is close to the river, the bank is provided with a revetment that will keep the river from reaching the levee slope.



### Joy appointment

■ Herbert G. Torpey has been named district sales manager for the San Francisco office of Joy Mfg. Co.'s Mining and Construction Division. He replaces L. C. Rhodes, now on an extended leave of absence.

Torpey will manage sales and service of Joy's line of equipment for mining and heavy construction in California, Hawaii, Alaska, and the western parts of Washington, Oregon, and Nevada. With Joy since 1951, he has been affiliated with the San Francisco sales office for seven years.

### Levee sets in cut

The sand was distributed by a Michigan 280 rubber-tire dozer. The water moved to a wood flume, and then impervious back to the river. The sand slopes were shaped with Cat D7 tractor-

Before the hydraulic fill could be placed, a considerable amount of dirt had to be moved. The ground was excavated to a depth of about 10 feet in the area of the levee base to obtain material for topsoil, river-bank berm, and road ramps. The topsoil was cast by a dragline to a stockpile on the land side of the levee. This material was later dozed into place on the land-side slope. The remainder of the material was moved by Cat D8's pulling No. 80 scrapers. These earthmovers built the impervious berm on the river side of the levee.

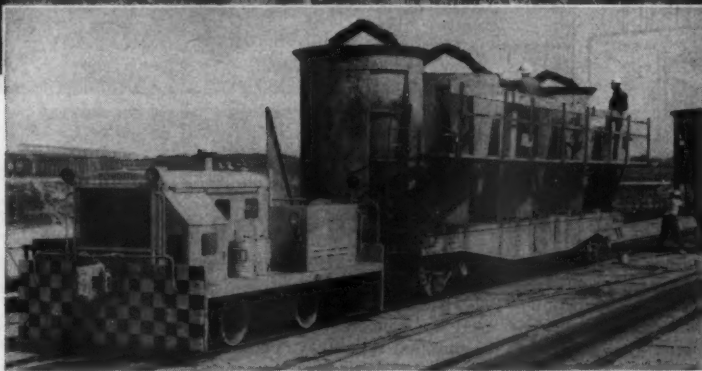
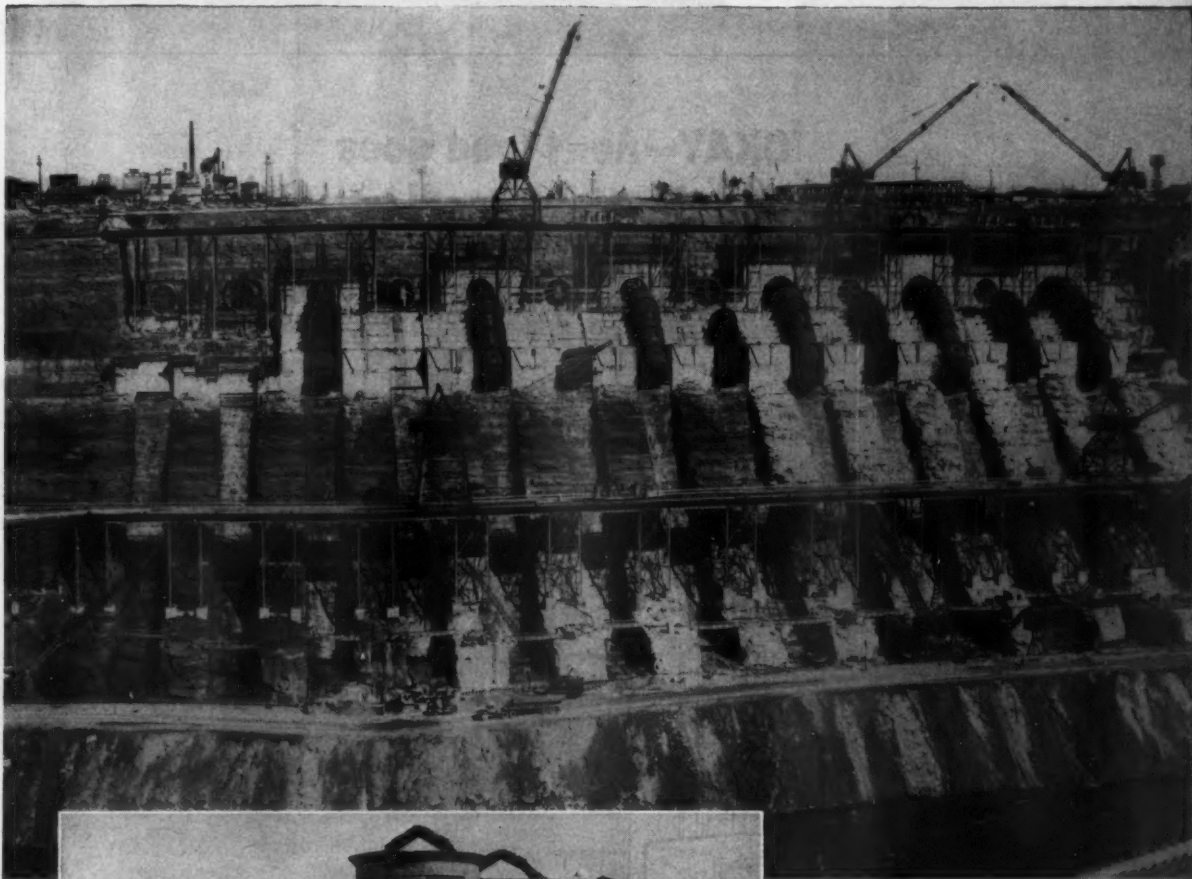
After the sand slopes were shaped, Mississippi was hauled in from a borrow pit to build the 5-foot impervious blanket on the river side of the levee. Starting at the berm, the material was "stepped up" the side of the levee in horizontal 8-inch lifts. A power spreader spread the material; compaction was accomplished by making 8 passes with a sheepfoot roller over each 8-inch lift.

### Personnel

Earl Simpson is superintendent for Barry Construction Co. Working with him on the project is the superintendent for Missouri Dredging Co., Robert L. McDonald.

The chief of the Construction Operations Division of the St. Louis District of the Corps of Engineers is C. Oheim. The project engineer for the construction is Edgar F. Pohlmann.

THE END



### Main Generating Plant—Niagara Power Project—Lewiston, New York

Like a massive stage setting, viewed from the Canadian side, is the Main Generating Plant of the Niagara Power Project of the Power Authority of the State of New York. Located five miles below Niagara Falls, this power project will harness the full potential of the United States share of Niagara Falls. When completed, it will produce 1,950,000 KW of electrical power.

## "Plymouth versatility speeds power project"

Six remote-controlled Plymouth Locomotives help speed construction operations for Merritt-Chapman & Scott Corporation, contractor for the main generating plant of the giant Niagara Power Project. In round-the-clock operations, these locomotives move concrete cars from the batch plants to the gantry cranes which place the concrete buckets in position for pouring.

Each Diesel-hydraulic Locomotive is

operated from a control station on the concrete car, where the operator can oversee car spotting under the batch plant and attach the crane clevis bolts to the pouring buckets at the construction site. Visibility is excellent in both directions and full control is exercised without an operator on the locomotive itself.

Special problems find quick solution in Plymouth Locomotives. On-the-job dependability and minimum maintenance,

coupled with smooth hydraulic power transmission have made Plymouth the choice on construction and tunnel jobs the world over. To check on a Plymouth Locomotive or Mine-O-Motive suited to your haulage needs, simply send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-29 Plymouth, Ohio. Purchase Plans available.

# PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE



PLYMOUTH  
LOCOMOTIVES  
In Progressive Industry  
throughout the world



Earl Simpson, superintendent for Barry Construction Co., and Robert McDonald, superintendent for subcontractor Missouri Dredging and captain of the tug St. Louis, talk over the job.

For more facts, circle No. 261--



MORE THAN 9 MONTHS AHEAD of the date that power was to be on the line, five of the ten generators of Priest Rapids Dam on the Columbia River in Washington are at work. The dam, 10,132 feet in length, will have a total name-plate rating of 788,500 kw. At left is the west-bank fish facility; next in line are the 22-spillway bays, the powerhouse, and east-bank fish facilities. Merritt-Chapman & Scott Corp., New York City, is on the job for the Public Utility District of Grant County.



"OKAY--next load goes to the cloverleaf!"



### Radio control keeps everyone on the go by keeping drivers in the know!

What caused your last work stoppage? Could it have been prevented by radioing your foremen and supervisors the exact job condition—letting them send their trucks directly to areas where materials or equipment were needed immediately? How much time and money would you have saved? Take your own work. How much time can radio save you in conferring, checking, planning, and trouble shooting?

Ask a nearby Motorola 2-way radio user. Learn firsthand how you and your foremen can become more productive—saving miles and minutes with each 2-way radio message.

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Call your local Motorola Factory Sales Engineer—or write today to see how 2-way radio can most profitably serve you. For companies with operations abroad—Motorola sales and service are available in 50 countries throughout the world.



## MOTOROLA 2-WAY RADIO

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For more facts, use Request Card at page 18 and circle No. 262

### Demolition firm offers Ebbets Field souvenirs but public is apathetic

■ If public response to an offer of souvenirs of Ebbets Field is any indication, baseball fans just aren't sentimental. Or it may be that Brooklyn fans don't cherish memories of the Dodgers now that the team has moved to the West Coast.

Harry Avirom, Inc., the Long Island City, N. Y., firm that has the job of tearing down the 33,000-seat ball park to make way for a giant apartment house project, recently offered souvenirs of Ebbets Field—at a small handling charge—to any one who would come and get them. But takers have been few.

It all started after Avirom began the demolition job on February 22 using a big wrecking ball painted to look like a baseball. Shortly afterward, the firm received a letter from a boy asking for a souvenir of Ebbets Field; a quarter was taped to the letter.

Figuring that a number of people might want souvenirs, Avirom invited the public to come and get what they wanted. The only charge was a nominal one for handling.

Available for the asking were more than 20,000 seats, which could be obtained in any quantity; dugout telephones; benches; lockers; steel from the roof and fittings; flagpoles; and railings.

Some 2,000 seats were taken by the New York City Department of Correction for an athletic field at Hart Island in the Bronx, and 7,000 seats had already been removed by the Dodgers for the Vero Beach, Fla., training camp.

Despite the poor response to the offer, an auction of the souvenirs is slated for early this month. The proceeds will be used to help build a Little League stadium nearby for youngsters living in the area.

### Calcium Chloride promotes Dickinson

■ William E. Dickinson, former president of the Calcium Chloride Institute, Washington, D. C., has been elected executive vice president.

In this capacity, he will assume the other responsibilities in connection with administration and development of annual programs of the institute. He will retain his former position as chief engineer, in which post he has been directly responsible for engineering research, and technical activities, and directs activities of all the institute's field engineers.

### Traffic keeps increasing on New Jersey Turnpike

Traffic on the New Jersey Turnpike in February totaled 3,351,183 vehicles, an increase of 343,722 over February of last year. Toll revenues for February this year were \$2,367,347, an increase of 11.3 per cent compared with the revenue for the same month a year ago.

CONTRACTORS AND ENGINEERS



# THE NEW LITTLEFORD SPRAY MASTER

bituminous distributor



Littleford's new Spray Master Distributor has been designed with one idea in mind...  
provide the construction industry with the most advanced unit ever produced.  
Engineering and design features of the new Spray Master are **the first really big  
changes in the bituminous distributor field in the last twenty years.**

Be sure you get the most for  
your money -- the Spray Master

Please send information on the New **Spray Master**

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For complete information on Littleford's  
SPRAY MASTER return this  
free air mail reply card.

**LITTLEFORD**  
Bros., Inc.



# INTRODUCING THE NEW SPRAY MASTER

bituminous distributor by Littleford



The new Littleford Spray Master illustrated above is equipped with aluminum jacketing, catwalks and skirting. You can purchase the style you desire... with or without these deluxe features. Regardless of style selected, the spray bar and exclusive features shown on this page are standard equipment. Whatever your choice of style, the Spray Master contains the most advanced engineering designs and labor saving features available to the industry today.



## 2. ROOMY OPERATOR'S PLATFORM

... no need to crawl up, under, around, or hang on. The Littleford Spray Master has a large, roomy platform provided for the operator's safety.



## 3. MODERN CONTROL PANEL

... all important controls are located in this panel board within easy reach and view of operator.



## 4. HINGED HOUSING FOR EASY MAINTENANCE

... working parts are easily accessible through Littleford's new exclusive hinged cover maintenance. One piece assembly swings back permitting easy adjustments when necessary.



## 1. SINGLE LEVER CONTROL

... no confusing lever... one easily understood... type hand wheel. Control operations.



## 5. UNOBSTRUCTED OPERATOR VIEW

... no part of spray bar is... by overhanging obstruction operator sees all of the bar knows how the bar is operating.

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FIRST CLASS  
PERMIT No. 23  
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Cincinnati, Ohio



For detailed information on the NEW Littleford Spray Master, return the postage paid Reply Card on this page.



## 9-story buildings for students at NYU

Construction of two 9-story residence halls for students at New York University's Washington Square Center is in the planning stage. The two buildings carry a price tag of more than \$4 million.

Demolition of the structures now occupying the site is expected to begin in July, and construction of the residence halls is scheduled for late summer or early fall, with a 1962 completion date.

The new structures will have a connecting corridor at ground level and will share a garden court. A 300-seat dining room will serve both residence halls.

A student community center will occupy the subbasement level. It will have a snack bar and 12 automatic vending alleys. The main floor plans include space for a huge lobby, an inner terrace, lounges, and hi-fi music and library areas.

The exterior of the buildings will be styled to blend with buildings in the immediate vicinity.

## Universal Atlas to expand cement plant in Texas

A modernization program that will double the capacity of the Waco, Texas, cement plant of the Universal Atlas Cement Division, U. S. Steel Corp., is currently under way.

The plant, built in 1929, produces gray portland cement, masonry cement, and a retarded oil-well cement. The present capacity of the plant, a kiln operation, is inadequate to meet the increasing demand for the markets in the Texas-Louisiana area. A second rotary kiln will provide a fully integrated 2-kiln operation, with an estimated capacity of over 2 million barrels of finished cement. The program is scheduled for completion in 1961.

## U. S. engineers study quake damage in Agadir

Four United States engineers, experts on design requirements for earthquakeproof structures, are currently studying structures damaged in Agadir, Morocco, by the earthquake that last month took some 10,000 lives and left 20,000 homeless.

The on-the-scene inspection is expected to turn up valuable technical information which, when combined with the substantial amount of seismological data available from previous U. S. investigations, will aid the Moroccan government in rebuilding the devastated area of Agadir.

W. G. Kirkland, chief of the engineering division of American Iron and Steel Institute, organized the team of engineers after the study was recommended by the institute's committee of Structural Steel Professionals. The study aims at aiding the Moroccan government and obtaining actual information on the nature of structural failures and damage caused by the quake. This information is to be made available to professional engineers, scientists, and building of-

ficials interested in the design of earthquake-resistant buildings.

The 4-man team is made up of Kirkland, a member of the AISI staff since 1947; Prof. Ray Clough of the University of California; T. R. Higgins, director of engineering and research for the American Institute of Steel Construction; and R. W. Binder, chief engineer of the Bethlehem Steel Co.'s Pacific Coast Division, Torrance, Calif., a director of the Earthquake Engineering Research Institute, and the chairman of the Seismology Committee of the Structural Engineers Association of California.

## Bethlehem Steel to erect Narrows bridge tower

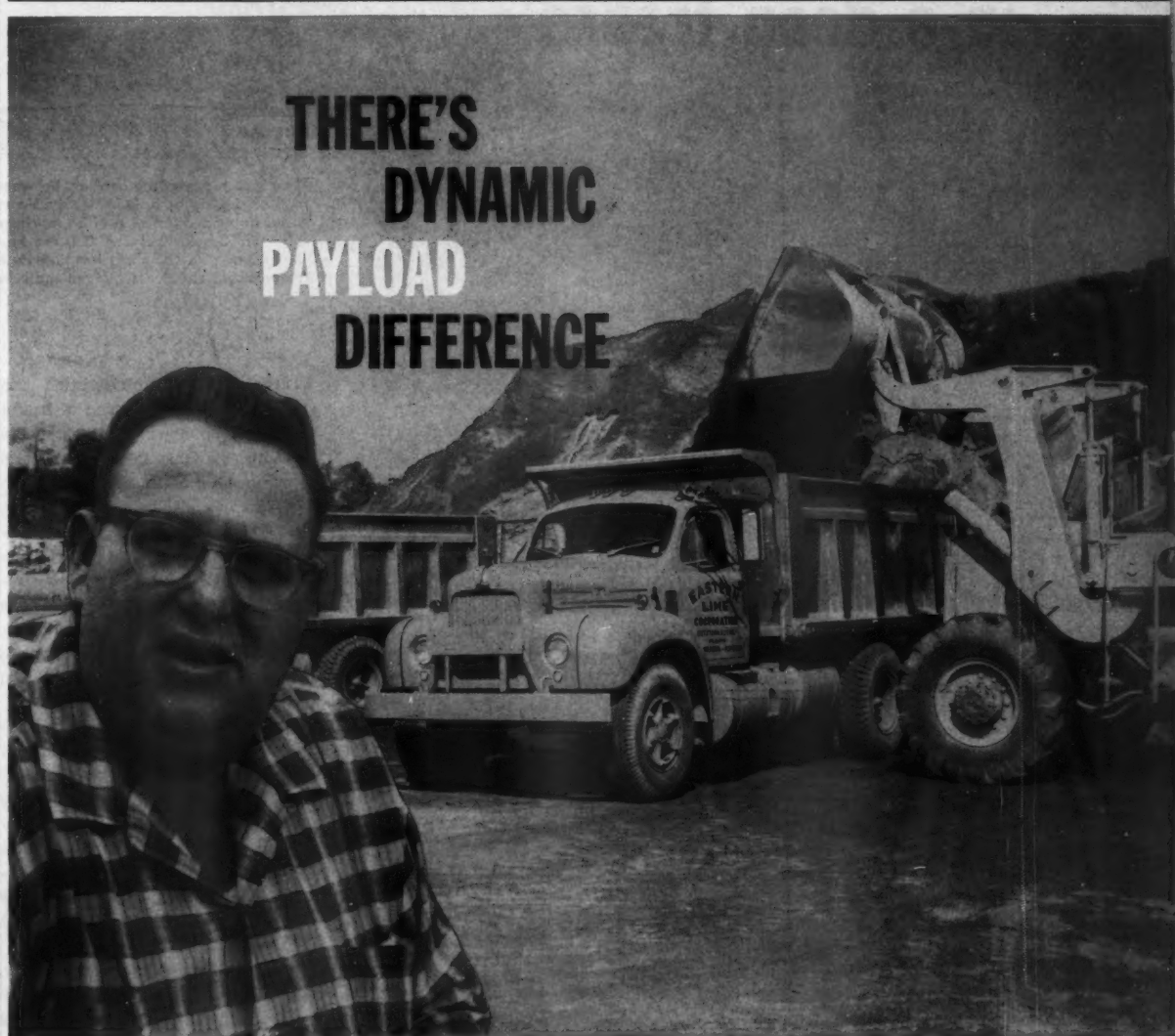
■ Fabrication and erection of the Staten Island tower of the \$320 million Verrazano-Narrows Bridge linking Brooklyn and Staten Island in New York City will be done by Bethlehem Steel Co., Bethlehem, Pa.

One of two giant towers to be built for the 12-lane suspension bridge, it will contain 27,000 tons of steel. The double-deck bridge will require some 160,000 tons of structural steel.

Bethlehem will fabricate the 630-foot-high steel tower at its Pottstown, Pa., works chiefly from about 16,000 tons of ½ and ¾-inch plate

and 8,000 tons of structural shapes and angles. About 800,000 high-strength bolts will be required to make all field connections.

The bridge, expected to be opened to traffic in 1965, will have a total length including approaches of 13,700 feet. The suspended span will measure 4,260 feet—60 feet longer than the Golden Gate Bridge in San Francisco. It will link the expressways of Long Island, Westchester, and New England with those in New Jersey, and will help relieve traffic congestion in midtown Manhattan.



THERE'S  
DYNAMIC  
PAYLOAD  
DIFFERENCE

**"EXTRA PAYLOADS will help pay for 4 new trucks—  
equipped with Hercules aluminum dump bodies!"**

*Reports Eastern Lime Corporation, Kutztown, Pennsylvania*

"By switching from dump units supplied by contract haulers to 4 new company-owned trucks equipped with Hercules aluminum dump bodies and front telescopic hoists, we are able to haul bigger legal payloads—make faster return trips that really speed up our delivery schedules," says S. G. Meitzler, of Eastern Lime Corp., Kutztown, Pa.

"In hauling jobs that include moving crushed limestone rock of various size from quarries to

cement mills . . . concrete, asphalt and blacktop plants . . . and to highway jobs . . . each 10-yd. unit hauls about 155 tons per day—averages 8 round trips totaling about 260 miles.

"We expect increased payloads to go a long way toward paying off our investment in the 4 new trucks."

Write for the complete story. We'll be happy to send you profit-packed information on aluminum bodies. Write Department A-460.



**Hercules**

**DUMP BODIES, HOISTS  
and DUMP TRAILERS**

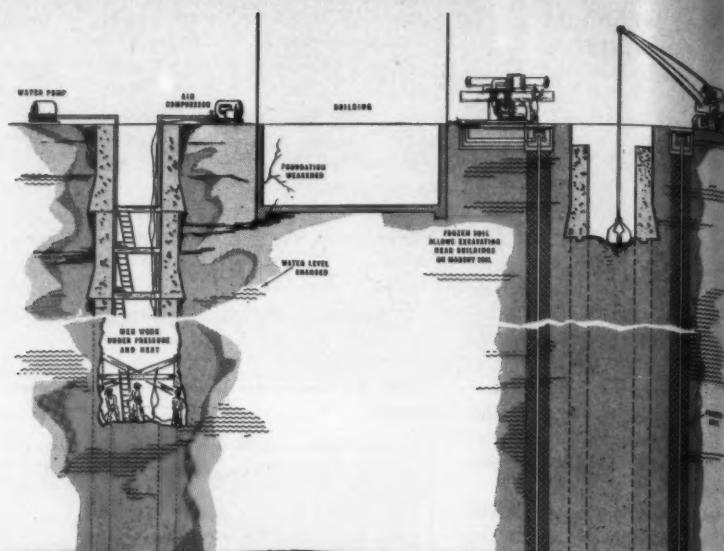
HERCULES STEEL PRODUCTS COMPANY • GALION, OHIO • U.S.A.

For more facts, use Request Card at page 18 and circle No. 264



Contractor handles tough excavation job by putting . . .

# A downtake shaft in a deep freeze



OLD METHOD

BEDROCK

GROUND FREEZING METHOD

This sketch shows the contrast between the conventional and ground-freezing methods of sinking a shaft in unsuitable material. The ground-freezing method is used in excavation of a 100-foot-deep downtake shaft in Manhattan as part of the Newton Creek Pollution Control Project. Freeze pipes, that circulate brine, are placed around the shaft location to stabilize sand and muck and prevent damage to adjacent structures. Frozen material is being drilled and hauled to the surface.



The deep-freeze system called for 21 freeze holes in a 26-foot-6-inch-diameter circle. Each freeze pipe connected to the supply and return manifold, consists of a 6-inch outside pipe closed at the end and a 2-inch inside pipe open at the end. These run 123 feet deep. As ammonia brine was circulated, columns of frozen ground grew around the pipes and eventually connected to form a huge column of frozen sand and muck.

Excavation with refrigeration was the answer to the question of how a 100-foot-deep downtake shaft could be sunk in unsuitable sandy and marshy material in New York City. The Manhattan downtake shaft—part of the force main tunnel contract of the Newton Creek Pollution Control Project—had to be constructed so that no damage was done to foundations of adjacent buildings. Every precaution had to be taken to prevent movement of any formation while the shaft was being sunk.

After much consideration, the contractor simply froze the ground and started excavation with conventional rock-drilling techniques. Other methods of shaft sinking were considered, but the special subsurface condition of the job and the restriction imposed by the contract made the freezing the most practical and reliable.

The method was decided upon as the result of a conference held by general contractor Poirier & McLane Corp., New York, N. Y., and the owner, The City of New York, Department of Public Works, at which features of the freezing technique were presented by Charles P. Gall of Winston Brothers Co., Minneapolis. This firm, called in for consultation, had used the method successfully on other projects.

## System designed

After studying the subsurface formations and determining conditions, engineers designed a freezing system requiring 21 freeze holes to be drilled on a circle 26 feet 6 inches in diameter around the shaft location. Freeze holes were 123 feet deep; freeze pipes—a 6-inch outside pipe closed at the end and a 2-inch inside pipe opened at the end—were installed in each hole and connected to the supply and return manifold.

A vertical deviation of only 1/4 of 1

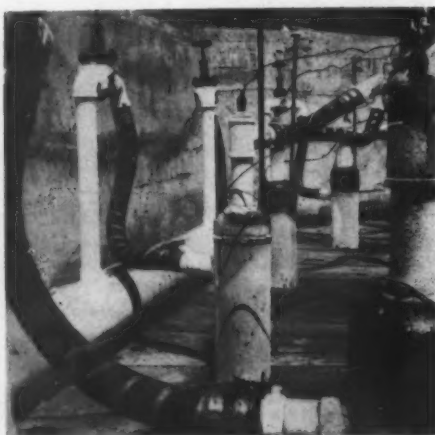
degree was allowed in drilling freeze holes in order to get a suitable pattern. Brine supply lines, 6 inches in diameter, conducted brine from the refrigerating plant to the freeze pipes. These pipes were equipped with valves to the brine supply and return lines for the regulation of the flow to the several holes. Thermocouples were installed at the inlet and outlet of each pipe with suitable instruments for measuring temperatures.

A hole was also drilled in the center of the shaft location and a brine line injected in it. This hole is drilled to provide information on the progress of the freezing and to serve as a pressure-relief hole.

Next to be determined was the capacity of a refrigeration plant to accomplish freezing in 60 days. It was decided to furnish two ammonia brine cooling systems, each having a capacity of 55 tons of refrigeration when supplying 385 gpm of calcium chloride brine at 17 degrees F. With this equipment and the connection of two brine pumps it is possible to operate either of the refrigeration systems or the brine pumps alone in case one fails. If this should happen, the unit operating by itself will be capable of maintaining the temperature level of the shaft while repairs are made to the inoperative unit.

Each refrigeration unit consists of a compressor, motor, condenser, evaporator, and suction trap. It was decided to build each unit on a structural steel base as a complete package. This will give more resale value to the equipment when the shaft is completed, since each unit will have sufficient capacity for a standard 85-foot ice-skating rink. In addition to designing, supplying, and installing the brine-cooling equipment, York Division, Borg-Warner Corp., also furnished and installed

Coolant is fed to 6-inch pipes from supply manifold valves, right; the return manifold, left, removes brine from the 2-inch inside line. The unstable material was frozen in 38 days; an ice wall was established in about 50 days.



Inside the shaft, a warmly-clad workman uses an Ingersoll-Rand pneumatic drill to break the material; another workman shovels it into a bucket that will be raised to the surface and dumped. The frozen sand and muck resembles rock and handles like rock.





cooling tower, condenser, water pump, starters, controls, and piping.

#### Holes drilled

Freeze-hole drilling was done by Pennsylvania Drilling Co., Pittsburgh, Pa., on a subcontract basis. When work started, it was found that the shaft location was astride a concrete wall, 3 feet thick and 10 feet deep, resting on heavy timber capping attached to timber piling 25 to 30 feet long. This condition was unexpected, and if any other method but freezing had been used, work on this phase of the excavation would have been more complicated.

The freeze holes were put down with a truck-mounted rotary drill using Hughes Tri-Cone bits to make holes 8 1/2 inches in diameter. The average spacing of the holes was 4.1 feet at the full depth of 123 feet.

After the freeze pipes were installed and hydrostatically tested for tightness, brine connections were made and the brine circulation to each hole was adjusted. During this adjustment, the brine circulated with the refrigeration plant not operating, and it was brought up to 1.265 specific gravity by the addition of calcium chloride. When the brine was up to its strength, the refrigerating plant was put into operation.

In making a complete cycle, the brine is pumped through the supply manifold, down the smaller pipes, up the larger pipes, through the return manifold, and back to the cooler of the refrigeration plant. Here, there is a reduction in the temperature of the brine, which is carrying heat extracted from the underground strata in contact with the outer pipes. Gradually, these outer pipes became surrounded by ice cylinders that increased in diameter as the freezing continued, and these ice cylinders eventually joined, forming a solid frozen wall so that the shaft could be excavated in free air.

#### Freezing sequence

When the freezing was started, the refrigeration load amounted to 135 tons. The load decreased to 74 tons in 10 days, 67 tons in 20 days, 46 tons in 30 days, 36 tons in 40 days, 36 tons in 50 days, 35 tons in 60 days, 28 tons in 70 days, and 26 tons in 80 days. At this point, the refrigeration load remained fairly constant.

The shaft area was frozen solid to the center at the bottom after 38 days, and the ice wall was established in 50 to 52 days. Excavation could have started 70 days after freezing was begun, but it was thought desirable to continue freezing to thicken the ice wall. Approval for excavation was given 80 days after freezing started.

In the first 10 days of freezing, the temperature of the brine was lowered from 50 degrees F., which was the ground temperature, to 2 degrees F. Brine temperature dropped in 20 days to zero, in 30 days to minus 7 degrees, in 40 days to minus 12 degrees, in 50 days to minus 14 degrees, in 70 days to minus 16 degrees, and in 80 days to minus 18 degrees, where it

(Continued on next page)



One of the two ammonia-brine cooling systems made by York Division, Borg-Warner Corp., is delivered to the job site by trailer. Each unit consists of a compressor, cooler, motor, condenser, and suction trap. It was built on a structural steel base so that it is a complete package with a high resale value. Each unit is capable of freezing a standard-size ice rink.



#### Report on the all-purpose Cat No. 619 with No. 442 Scraper

**"This rig has more features than anything we looked at in its class. More power, speed, maneuverability"**

George Hudson, Construction Supt., Grant County, Wis.

To keep an 8 to 10 mile per year road building program on schedule, Grant County needed a fast, compact mobile earthmover for use on longer hauls and larger yardages. After testing competitive rigs, a demonstration sold the county on a Cat No. 619 with matching No. 442 Scraper. Reason: it has more "bonus features" than any other machine in its class.

First assignment for the No. 619—relocating a half mile of road to eliminate a bad curve. 14,000 cu. yd. had to be removed to make a 14-ft. cut. The job proved to be a stop-and-go affair—haul distance 375 ft.—with tough material—sand, rock and clay so stubborn that much of it needed ripping. The No. 619's lugging ability and easy handling on sharp turns pay off. And on longer hauls, Superintendent Hudson reports the No. 619 "climbs up a 5% grade in 4th gear with a good load."

Here are some reasons why the No. 619-No. 442 is an "all job" rig loaded with performance. A Turbocharged Cat Engine delivers 225 HP and high torque rise for fast acceleration and lugging power under capacity loads. The LOWBOWL Scraper handles 14 cu. yd. struck... 18 cu. yd.

heaped. The No. 619-No. 442 team has 30 MPH usable operating speed... hugs the ground for roadability found in no other 2-wheeled earthmover of its capacity. Newly developed 2-jack hydraulic steering gives effortless maneuverability yet retains "feel of the road" control. This advance steering permits full 90° turns in a diameter of 30 ft.

Get the full story on this hurry-up, all-purpose rig from your Caterpillar Dealer. Ask for a demonstration under the job conditions you face. See how you can make use of its versatility to step up production on your job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

## CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**NO. 619-NO. 442  
FOR "ALL JOB" VERSATILITY**

For more facts, use Request Card at page 18 and circle No. 265



## Construction Camera



At John Day Dam near Goldendale, Wash., water for use on the embankment is pumped from the Columbia River by a Rex 6-inch pump and into a Euclid water wagon. The \$1 million contract on the early stages of the \$387 million dam is held by S. S. Mullen, Inc., Seattle. An incidental part of the work is con-



struction of a dewatering sump inside the first-stage cofferdam. The 30-ton motor crane on a Dart carrier is driving sheeting for the sump, using a 3,500-pound drop hammer. A Pitman Hydra-Lift is delivering a clam for sump excavation. The cells, background, rank with the highest ever built.



## Where heavyweights move job records prove... FIRESTONES PULL HAUL COSTS DOWN!

Take a tip from nationwide construction records—Firestones lower tire costs per job! Here's why: Firestone off-the-highway tire dependability plus Firestone's Giant Tire Service keeps expensive equipment on the job and working. Firestones are built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires. Firestone Shock-Fortified nylon cord is a natural for off-highway loads—holds impact damage to the minimum. And your Firestone Tire Expert will help you match tires to the job as well as handle all maintenance problems. Turn downtime into worktime with Firestone tires and service! Call your Firestone Dealer or Store today.

WHEN ORDERING NEW EQUIPMENT ALWAYS SPECIFY FIRESTONE TIRES

# Firestone

BETTER RUBBER FROM START TO FINISH

For more facts, use Request Card at page 18 and circle No. 266

### TUBELESS OR TUBED



Super Rock Grip  
Wide Base\*

Super Rock Grip  
Deep Tread\*

Copyright 1960, The Firestone Tire & Rubber Co.

\*Firestone T.M.

(Continued from preceding page)

remained relatively constant. The temperature differential between brine entering and leaving the freeze pipes varied from about 3 degrees at the start of freezing to 3/4 degree F after 70 days.

### No formula

Attempts have been made to develop an empirical formula to express the relation between the brine temperature, the size of the freeze pipes, the amount of brine flow, and the spacing of the freeze pipes in order to establish an ice barrier in a given time. So far, no such formula has been developed, probably because not enough information is available about the behavior of the formations during the freezing. Nor is it known how fast the frozen zone around the freeze pipes develops with a given setup or how far it ultimately extends.

But reliable techniques have been developed to ascertain when an ice barrier has attained sufficient strength to resist external forces so that shaft excavation can be carried on safely. Methods have also been developed to relieve the expansion of the formations as the freezing takes place. Without this relief, there would be a lateral displacement of



A crew member checks the slope of the frozen walls of the shaft. Here a shaft has been formed for the next concrete lift to be placed.

CONTRACTORS AND ENGINEERS

## Saved

A Gateway C

angle at the

concrete to e

forced with w



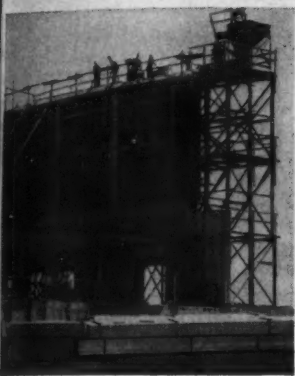


A Gateway Center is a new address and a new building for Pittsburgh's Golden Triangle at the confluence of the Monongahela and Allegheny rivers. Workmen place concrete to encase a beam at the parapet. The roof is a 4-inch structural slab, reinforced with welded-wire fabric, spanning between beams at 8-foot centers.



A base course of hot-mix for a 2-mile section of State Route 117 south of Roundhead, Ohio, is rolled out by a Huber-Warco 10 to 12-ton 3-wheel variable-weight roller. The job included complete rebuilding and widening of the road, as well as complete rebuilding of three intersections.

## Saved! One Month



### Extensive Use of Symons Steel-Ply

#### ...Speeds Work on "Rush" Job

New, non-military, air route traffic control center building near Fremont, California will help control and direct aircraft, prevent collisions, and guide "lost" planes over a wide western area.

J. H. Pomeroy & Co., Inc. San Francisco was the contractor.

The project was unusual because of the speed with which it had to be erected. The building is perhaps the first non-military structure in the west that has been designed to withstand atomic "fallout." The contractor gave careful study to the most time-saving methods. Symons Steel-Plys proved to be one of the principal time-

savers. They were used on all major construction and were also adapted for pouring of large, reinforced concrete beams that were set between steel columns for blast protection.

Complete "Air Route Traffic Control Center" story sent free upon request. Symons Steel-Plys can be rented with purchase option.

**Symons**  
SYMONS CLAMP & MFG. CO.  
4251 Diversy Ave., Dept. D-0, Chicago 39, Ill.  
Warehouses Throughout the U.S.A.

MORE SAVINGS FROM SYMONS

For more facts, circle No. 267

APRIL, 1960

the formations and heaving at the surface.

The application of freezing to seal off water flows and to solidify unstable formations has enormous possibilities in the construction industry. Various materials, when frozen, develop strengths varying from 300 psi for pure ice to 1,700 psi for tightly packed sand. The various materials also have different thermoconductivity and insulating characteristics that must be taken into consideration in the design of a freezing system. Disregard of these factors probably led to failures on some of the projects where freezing has been attempted.

The lined shaft, which will have a finished diameter of 8½ feet, is being concreted from the top down in about 20-foot lifts to provide a lining of a minimum 3-foot thickness. At the bottom of each lift, the excavation into the frozen walls of the shaft is belled out to provide sufficient bearing for the concrete lining. Heat of hydration developed in concrete placement has caused little or no thawing of the frozen area.

#### Personnel

U. Serra Zanetti is the project engineer on the job for Polier & Mc-Lane Corp.

THE END

### Engineers Inc. adds F. C. Winter to staff

F. Clinton Winter, Jr., has been made assistant to the vice president of Engineers Inc., a Newark, N. J., consulting engineering firm. Winter will deal with contract administration and client relations.

### Goodrich builds plant

The B. F. Goodrich Co., Akron, Ohio, is building a multimillion-dollar tire manufacturing plant on U.S. 24 east of New Haven, Ind. B. F. Goodrich Tire Co., a division of the company, will operate the 850,000-square-foot facility, located on a 350-acre tract on the banks of the Maumee River. The plant is designed to permit straight-line production, with raw materials entering at one end of the building and emerging at the other as finished products.



Completely new design uses simple turbine wheel for power.

## NEW VIBER TURBOVIBER®

Powerful, dependable,  
high speed, form vibrator  
for concrete casting yards

10,000 rpm. Exerts over a ton of force.

No motor lubrication. No sliding friction. Minimum maintenance.

Only one rotating assembly. Long life.

Always starts. No vanes to stick.

Drastically reduced operating costs.

Convenient mounting clamps for easy attachment to any form.

For additional information, see your Viber dealer or write Viber Company, 726 South Flower Street, Burbank 21, California.



## Viber Vibrators

Pioneers and leaders in the manufacture of vibrators

For more facts, use Request Card at page 18 and circle No. 268



## Manufacturers Memos

Max E. Colson, vice president of Atlas Powder Co.



Atlas Powder Co., Wilmington, Del., has elected Max E. Colson vice president. He will be in charge of the company's Explosives Division, succeeding W. C. Lytle, who retired.

Andrew W. Shearer was appointed a technical press representative in the public-relations department; he will also be editor of the company's house organ. Shearer will be available to work with trade-magazine editors in developing stories concerning Atlas chemicals and explosives.

Several sales representatives have been appointed by Trailmobile Inc., Cincinnati. William H. Nelligan and David F. McCoy have been assigned to the Midwest Division; William T. Murphy, Jr., and M. W. Doyle to the Southwest Division; and Anthony J. Pasqua and William J. [unclear] to the Eastern Division. Also appointed were Richard E. Adams, Vincent Gattuso, and Joseph Kennedy to the West Coast Division; Earl [unclear] and Lester J. Schlager to the Central Division; and William A. [unclear], Kenneth B. Northcutt, Arnold S. Lessing, and Darrell T. Smith to the West Central Division.

R. L. Millikin is the new manager of the Greensboro, N. C., branch.

Trailmobile Finance Co., a subsidiary, has appointed William J. Chapman a vice president and general manager.

Two major executive changes have been made in the Marion Power Shovel Co., a division of Universal Marion Corp., Marion, Ohio. Adrien F. Busick, Jr., former executive vice president and general manager, is now president and general manager. David Reich has been appointed assistant to the president of the parent company but retains his post of vice president of administration of the division. In his new capacity, Reich will act as liaison officer between the division and the parent company.

The Lincoln Electric Co., Cleveland, has assigned E. Larry Smith as district manager of the New York sales-engineering district, and John H. McFeeters as district manager of the Albany, N. Y., district. Russell S. Hale is now district manager of the Boston district.

John Farran has been named director of service for the firm succeeding G. E. Tenney, who retired.

The company has established a new sales district in Florida, with headquarters at 3455 N. W. 54th St., Miami. G. N. Bull is the district manager.

Three sales representatives have been appointed by L. B. Foster Co., Pittsburgh. Frank K. Gunther, who will specialize in sales of rail and track accessories, and Philip G. Hughes, who will handle the company's line of construction products, will make their headquarters in the home office. William J. Bedford will operate out of the Los Angeles office.

Norval T. Grubb has been appointed manager of the Construction Equipment Division, Electric Steel Foundry Co., Portland, Ore. He was formerly assistant manager of the division.

Richard G. Rand, sales engineer for Food Machinery & Chemical Corp., Florida Division.



Richard G. Rand has been named Northeast sales engineer for Form-Crete prestressed-concrete casting forms by Food Machinery & Chemical Corp., Florida Division, Lakeland, Fla. From Bristol, Conn., headquarters, Rand will cover New York State, New England, and eastern Ontario and Quebec, Canada.

The board of directors of the Chemical Corp., Passaic, N. J., has appointed four executives to top administrative and research positions. Andrew G. Clauson, Jr., has been elected chairman of the board. He continues as treasurer. Hugh [unclear] is the newly elected secretary, and continues as assistant treasurer. Walter V. Bayer is assistant secretary of the firm.

Raymond J. Schutz has been appointed vice president in charge of research and development. He will coordinate the research, development and technical activities of the company, as well as approve new production work and quality-control procedures.





William Fraser, president and general sales manager of Worthington Corp.

Worthington Corp., Harrison, N. J., has elected A. William Fraser vice president and general sales manager. He was formerly general marketing manager. The corporation has established a new southern resale region with headquarters in Atlanta. The region embraces the sales territories of At-

lanta, New Orleans, Houston, Dallas, and Tulsa. R. N. Franz is manager.

F. J. Reardon has been appointed central-region resale manager, succeeding Franz.

W. C. Cheek, H. W. King, and W. J. Van Vleck have been named commercial vice presidents.

The National Tube Division of U. S. Steel Corp., Pittsburgh, has appointed William C. French, Jr., sales manager of the eastern area. He succeeds Louis W. Mason, the new general manager of sales.

The company's American Steel & Wire Division has appointed Everette B. Cousins assistant comptroller, suc-

ceeding S. G. Harris, the new comptroller of the American Bridge Division.

John A. Fuller has been elected a director of U. S. Steel.

John F. Harrison, manager of the new Compaction Division of Littleford Bros., Inc.



Littleford Bros., Inc., Cincinnati, has appointed John F. Harrison manager of its newly created Compaction Division. He will supervise the expan-

sion of compaction equipment already manufactured by the firm and develop new equipment in that field. Stanley Thompson will assist Harrison.

Fulton Cotton Mills, Atlanta, has appointed J. O. Pullen a sales representative specializing in the sales of canvas products in Georgia, Florida, and Alabama. He will have headquarters in Atlanta.

The Lufkin Rule Co., Saginaw, Mich., has appointed George J. Schlitt, Jr., its west-central division sales manager, replacing Donald F. Oltz, who has been promoted to assistant sales manager. Schlitt continues to have his headquarters in Chicago.

East-central division sales manager William F. Rockwell, has moved his headquarters to Cleveland from the home office.



Charles E. Bain, vice president and general works manager of American Pulley Co.

The American Pulley Co., Philadelphia, has elected Charles E. Bain vice president and general works manager. In that post he will be responsible for all phases of product development, research, engineering, and manufacturing.

Several new appointments have been made by Harnischfeger Corp., Milwaukee. Kenneth A. Willig is the national sales manager for the newly formed Small Excavator Division. From headquarters in the home office, Willig will be primarily responsible for directing field sales personnel and P&H dealers in the marketing of all machines of 20-ton capacity and under.

Joseph Surmacz is the new plant manager at West Milwaukee. David Drewery has been appointed director of production and industrial engineering at the headquarters plant. He will continue to administer the industrial engineering department, and will take on the supervision of production control, inventory control, and allied staff functions.

Robert Over has been named superintendent of machine shops, heat-treat, salvage, and cutoff departments at the same plant.

Herman Van Houten has been elected vice president and general manager of the Mining & Construction Division, Joy Mfg. Co., Pittsburgh. He will be responsible for the administration of all sales, service, engineering, and manufacturing functions of the division.

He is also a director and vice president of Joy's Mexican subsidiary, Joy-Sullivan Machinery Co., S. A. de C. V.

# The all-new all-job crawler with Hydro-Shuttle

## MONEY-MAKING CAPACITY FOR ALL YOUR CRAWLER JOBS!



**DOZER**—The tougher, huskier MOTRAC combines crawler traction, Hydro-Shuttle torque converter drive and Moline-built engine power for bulldozing, grading and clearing.



**SCARIFIER**—This powerful hydraulic scarifier rips into asphalt or hardpan surfaces... teams with the MOTRAC shovel for fast grading and excavation.

Name the work assignments your new crawler must handle. Then see how the MOTRAC tackles them—see how this powerful, easier-handling crawler boosts output on every job!

**On loading**, MOTRAC's torque converter drive with toe-operated Hydro-Shuttle takes you from full-ahead crowding to full reverse at the touch of a pedal... smoothly, hydraulically, without shifting. You get faster cycles—more yardage per hour.

**On excavating**, you work with a 1½ yard bucket, 9000 lbs. of break out force, 59 engine horsepower (gasoline) and 2086 sq. in. of ground-gripping track surface. You get full buckets, pass after pass—new work capacity.

**On grading, backfilling, road bed preparation**—MOTRAC power... MOTRAC easy handling get the job done at low per hour cost. You get the long-life assurance of husky Moline-built gasoline or diesel engines, 1000-hour service track rollers, heat exchanger crankcase cooling, oil bath air cleaner with pre-cleaner.

See the new MOTRAC in action—check with your Moline Industrial Dealer now or mail the coupon today!

ROGER HIPWELL—Phone West 8-2771  
Industrial Sales Manager, Minneapolis-Moline, Hopkins, Minnesota

☐ Send me name of my Minneapolis-Moline Industrial Dealer.  
☐ Send me catalogs on the new MOTRAC Crawler.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# MINNEAPOLIS MOLINE

The fastest-growing line of industrial equipment!

\*Moline Dealers give the best parts service in the industry.



Series B  
Model H-70  
Model H-90  
**NOT  
NEW**  
but . . .



Series "B" H-70 PAYLOADER

**with numerous improvements that  
give INCREASED PRODUCTION  
and BETTER PERFORMANCE**

"PAYLOADER" leadership over the years is based on superior design, construction and performance of each Model. And "PAYLOADER" leadership is maintained through a policy of progressive engineering. Engineering and research staffs are continually developing and testing new materials, methods, and designs, all directed to improve "PAYLOADER" performance in terms of serviceability and increased output.

As soon as new developments are thoroughly perfected and proved in fleets of test units, they are incorporated into production models. That is why we say the Series B Models H-90 and H-70 are not new machines, but have incorporated into them many new features and design improvements that make them even better performers than before. Your nearby HOUGH distributor is eager to prove it.



## PAYLOADER®

### Model H-90 Series B

CAPACITY: Operating . . . . 9,000 lbs.  
Peak Lift . . . . 18,000 lbs.

**NEW ENGINE:** New, powerful Cummins Turbo-charged diesel engine develops 162 hp at 2,100 rpm. GMC Diesel is optional—develops 153 hp at 2,200 rpm.

**MORE STABILITY:** Wheelbase is extended and wheel tread is widened which, along with greater machine weight, greatly increases the balance and stability of the machine for ANY working condition.

**MORE TRACTION AND FLOTATION:** Standard tire size is increased to 18:00 x 25, insuring more traction and flotation whenever they are needed.

**MORE STRENGTH:** Front axle, main frame and other structural parts have been strengthened to meet the greater work potential of which this machine is capable.

**TRANSMISSION AND TORQUE CONVERTER:** Major improvements have been accomplished in the full power-shift transmission and the torque converter, resulting in superior throttle response and operating characteristics.

**AIR BRAKES:** New air brakes are standard equipment and give more positive action with less operator effort than ever before.

## PAYLOADER®

### Model H-70 Series B

CAPACITY: Operating . . . . 7,000 lbs.  
Peak Lift . . . . 13,000 lbs.

**MORE POWER:** Available with a larger diesel engine (Cummins 124 hp). Also available with IHC gasoline engine of 110 hp, and GMC diesel engine of 105 hp.

**MORE LIFTING POWER:** Improvements in the boom arm design and bucket control linkage provide more digging power especially for digging below grade.

**HYDRAULIC RESERVOIR:** The capacity has been increased to gain greater efficiency for the operation of the many hydraulically-actuated allied accessories that are available, such as: 4-in-1 bucket; side boom; back-hoe.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.



### Series "B" H-90 PAYLOADER

NEW LITERATURE is available without obligation on the Series B Models H-70 and H-90, also, an illustrated folder showing all 10 "PAYLOADER" models and the many useful attachments for each.



# HOUGH®



THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



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### THE FRANK G. HOUGH CO.

762 Sunnyside Ave., Libertyville, Ill.

Please send the following:

- ☐ Data on Series B model H-70
- ☐ Data on Series B model H-90
- ☐ Complete "PAYLOADER" line and all attachments

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

4-B-1



## Tricks of the Trade

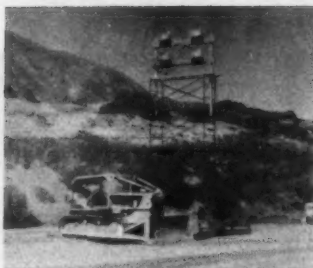
### Mercury vapor lamps in groups of four illuminate dam site

Mercury vapor lamps provided unusually good illumination of the work areas for crews making the excavation for the spillway of John Day Dam on the Columbia River near Goldendale, Wash. S. S. Mullen, Inc., which had the spillway excavation contract, installed the lights to enable the crews to work safely and efficiently through the dark hours of the two 9-hour daily shifts.

Four 1,000-watt mercury vapor

lamps installed on a portable steel tower illuminated the fill area, while 20 of the lamps were set up in groups of four in the spillway excavation area. Two Kohler generators operated two sets of the lights while a Cat 30-kw generator set provided power for the others and also ran a pump.

Project manager Harry Claterbos observed that while the original installation was more expensive than ordinary floodlighting, a smaller number of lights gave better illumination to the work areas than the conventional floodlights and reflectors. Claterbos had occasion to ob-



serve the night operation from the highway on the Oregon side one night. Even at this great distance, he could easily distinguish the several individual pieces of equipment as they came into the excavation to load.

The lamps used on this installation were type F-1000 A and B manufactured by Wide-Lite Corp. of Houston.

### Ripper on dozer blade cuts rock outcropping after spread moves on

Getting rid of that last rock outcropping that still projects a couple inches above subgrade after the grading spread has pulled out is not an uncommon job problem. Fiorito Bros. Construction Co., Seattle, made good use of an Esco Buck Forte ripper on the blade of a Cat D8 to handle the situation on a new freeway grading job at Olympia, Wash.

The project included 800,000 cubic yards of rock in two big cuts. Fiorito's crews drilled and shot. The blasted rock was loaded by a pair of Euclid S-18 scrapers pushed by a pair of D9 tractors. This type of shovel and truck operation was



on scrapers. But Fiorito's crews found that if they kept the scrapers out of gear on the loading cycle and let the tractors do the pushing, they got full loads without excessive wear on tires or other damage to the scrapers.

Carrying traffic through the area during the excavation complicated the work and made it difficult to get an accurate check of the finished grade. After the scrapers had leveled the job was about ready for paving and surfacing, the final blue-topping disclosed some rock outcroppings above subgrade.

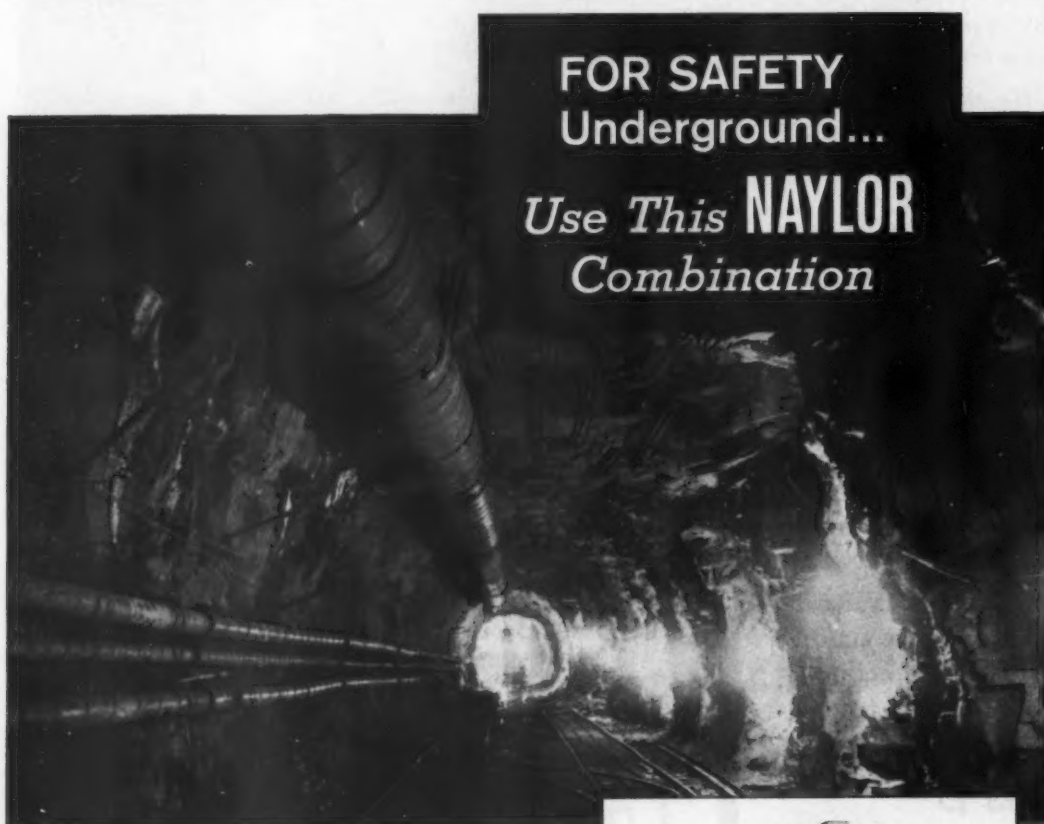
The Buck Forte ripper was attached to the blade of a D8 tractor-drawn that was still on the site, and the combination was able to break up the excess rock to the satisfaction of the resident engineer. This saved bringing drilling equipment—already moved to another site—back to the job.

### Trench in gravel pit produces water supply for paving contractor

Tapping a shallow underground water supply saved a substantial amount of money for a contractor on a large paving project in the state of Washington.

The nearest available source of water was some 3½ miles away, and this would have meant seven additional miles of truck travel for each load of water hauled to the job.

As a gravel pit was being opened, the contractor's superintendent noticed signs of moisture in the bottom at one end, and he discovered that several nearby residents had shallow wells that apparently provided adequate supplies for domestic use. Checking the elevations by level, he concluded that the wet spot in the pit was fed from this same source.

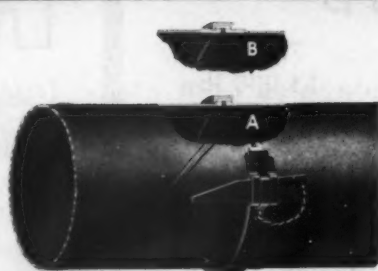


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Underground...  
Use This **NAYLOR**  
Combination

When you need lines to bring in fresh air and to exhaust gases and fumes in underground construction, there's no better pipe line combination than NAYLOR Spiralweld pipe and NAYLOR Wedgelock couplings.

The distinctive lockseam-spiralweld structure creates a light-wall pipe with extra collapse strength and safety factors for push-pull ventilation. The Wedgelock coupling speeds installation and makes it possible to couple joints with only one side of the pipe in the open. Lines hug the wall and can be extended quickly as work progresses.

For air, water and ventilating service, it will pay you to get the story on this NAYLOR pipe line combination. Ask for Bulletin No. 59.



The NAYLOR Low-Pressure Wedgelock coupling for ventilating service can be furnished for pipe with (A) accurately-sized shoulder ends, or (B) with grooved ends. A hammer is the only tool needed to connect or disconnect this coupling.



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**PIPE** Company

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Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

For more facts, use Request Card at page 16 and circle No. 271



Playing his hunch, the super had  
digger scoop out a trench about 7  
feet deep and 100 feet long across  
one end of the pit. Water began  
seeping into the trench almost im-  
mediately. By the next morning, the  
water stood nearly 3 feet deep. Water  
trucks could not haul water away fast  
enough to lower the water level ap-  
preciably.



A Jaeger 3-inch 2-stage pump and  
CMC 4-inch pump loaded the water  
trucks. During the time the job was  
in progress, trucks hauled thousands  
of gallons of water to the roadway  
without ever depleting the supply.

In the picture, the Jaeger pump is  
loading water into a Rosco bitumi-  
nous distributor. This water is being  
used to dilute emulsified asphalt  
used as the seal coat on the cement-  
treated base course of the job. The  
mixture is warmed and mixed in the  
distributor before application.

### Toy wagons play big part in transporting men, tools on sewage-disposal project

Little red wagons were more than  
just toys to crews of Dravo Corp.,  
Neville Island, Pittsburgh, Pa., dur-  
ing construction of the Allegheny  
County Sanitary Authority sewage-  
disposal system.



Cleanup crews had to get back and  
forth inside a 48-inch-inside-diameter  
concrete line that is part of a 10-  
mile stretch of tunnel for the project.  
But the men, removing waste matter  
after pipe in this section of the tun-  
nel had been laid, found the passage-  
way too confining to carry tools and  
materials by hand. And the time  
needed to complete this phase of the  
work was too brief to justify the in-  
stallation of tracks and mine cars.  
Therefore, wagons were pressed into  
use as carriers. They did a good job,  
too.

### Air-operated batch gates work as driver pushes buttons on instrument panel

Air-operated batch-gate locks per-  
mit the guide man (foreground of  
picture) to keep back out of most of  
the dust and danger that are usually  
his lot in a concrete-paving crew. The  
driver-operated gates also eliminate  
the series of levers on the outside of  
the truck and the dangling ropes that  
are usually needed to actuate the  
forward gates.

Peter Kiewit Sons' Co. equipped  
nine new Ford batch trucks with

Timpte dump bodies and air-operated  
batch gates to accompany their new  
Rex slip-form paver on concrete-  
paving projects in Colorado. Wagner  
compressors, driven from the truck  
engines, provide the air supply for  
the gate cylinders, which are mount-  
ed up under the dump box.

Each of the trucks carries five 37.4-  
cubic-foot batches. To dump the first  
batch, the driver trips the tail gate  
by the usual hand lever. To unload  
the succeeding four batches, he sim-  
ply operates successive push buttons  
mounted on the instrument panel.

This makes it possible for the guide  
man to stand back out of the dust

and in a better position to direct the  
truck driver dumping the batches.



## SPECIAL REPORT TO CATERPILLAR OWNERS:



Parts you can trust  
... cost less per hour

## OPTIONAL TRACK GROUPS

up-date D9 or D8 Tractors for longer undercarriage wear

Now, two types of track groups are available for older model D9 and D8 Tractors . . .  
regular and optional, allowing you to tailor your undercarriage parts to meet job conditions.

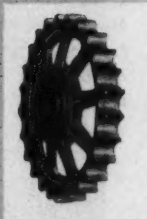
Lighter tones at top of etched cutaways show  
depth of special hardness in wear zones.



**REGULAR** track parts are made from durable steel.  
They're heavy-duty, long-lived, special-hardened to re-  
sist wear.

**OPTIONAL** track parts are equivalent to those used on  
current production model tractors. The links and shoes  
are made from Caterpillar's new alloy steel that is hard-  
ened much *deeper* than regular steel. Link rails are hard-  
ened twice as deep. Shoe grousers are hardened 400%  
deeper. The new alloy steel also provides greater strength  
with more impact resistance.

**MORE METAL WHERE IT COUNTS.** Optional compo-  
nents are king size. Every part is  
beefed up and made bigger with  
more *hardened* steel in wear areas.



**BORALLOY "HUNTING TOOTH" SPROCKETS** are another new feature of the optional  
groups. Every other tooth is used in one revolution, alternate teeth being picked up the  
next revolution. This alternation means that teeth contact the bushings only *half* as many  
times as do regular sprocket teeth. More important are the teeth themselves—they're  
machined for exact fit with the big bushings. This greatly extends bushing life.

### COMPARE regular and optional track components:

	Pitch	Pins O.D.	Bushings O.D.	Track shoe bolts and nuts	Sprocket
D8	regular 8 inches	1 3/4 inches	2 3/4 inches	3/4 inch	14 tooth
	optional 9 inches	2 inches	3 inches	7/8 inch	25 tooth
D9	regular 9 inches	2 inches	3 3/16 inches	7/8 inch	28 tooth
	optional 10 1/4 inches	2 1/4 inches	3 3/8 inches	1 inch	25 tooth

**HOW MUCH MORE LIFE?** Variation in the length of track life occurs because components have different  
wear rates under various soil and job conditions. In sand, pins and bushings wear faster. In rock, shoes  
and links wear faster.

**ON-THE-JOB TESTS** confirm that the new optional track components are giving up to 40% more life than  
the regular parts. On many applications, you can expect even greater wear life.

**CORRECT TRACK GROUP SELECTION IS IMPORTANT.** It depends on job types and conditions. Let your  
Caterpillar Dealer analyze your track needs. He'll recommend the correct components to help you get  
maximum life at the most reasonable investment. Call him soon.

### SERVICE TIP:

**FREE!** Handy reference for ordering track  
options. "New Options for D9 and D8  
Tractors" includes part numbers that are  
used to adapt to your older models. Pick  
up a copy at your Caterpillar Dealer's.

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# Maintenance in Action

Good program for taking care of equipment  
keeps rigs on the line and earning money

by BILL ALLEN, field editor

"Take care of your equipment, and it will take care of you," says Ralph Jolitz, equipment superintendent of Alley Construction Co., Inc., Faribault, Minn.

And equipment care is one of the main reasons for the rapid growth of this young construction company. Under the guidance of its president, Merle Alley, the company has grown from a 2-tractor outfit in 1936 to an earthmoving and bridge firm doing a \$2.5 million annual business.

In stressing maintenance, the company has developed policies unique for an organization of its size.

One man, the equipment superintendent, is responsible for the maintenance of all the equipment on the several jobs in progress. He is a key man; if he feels equipment is in need of repair, he has the authority to pull it out of the working spread.

On an earthmoving job, the mechanics and oilers have two full hours at noon to go over the equipment. Operators get an hour rather than the customary half hour for

lunch, and break times are staggered so that the maintenance force is able to get in at least two hours' work.

The company makes a practice of hiring the best mechanics and lubrication technicians (no grease monkeys here) that can be found. They are well paid and well trained. As a result, they tend to stay with the company for many years.

Detailed records of the performance of each piece of equipment are maintained so that the equipment superintendent can tell at a glance the number of hours a particular machine

has worked, its downtime and the repairs it needs to get back in operation.

## Maintenance in action

The company's maintenance policies work well in practice. Currently, the firm is handling a good-sized grading job requiring removal of 20 million cubic yards of dirt on a 10-mile stretch between North St. Paul and Stillwater, Minn. For some of its length, service roads had to be cut out to border the 4-lane divided state highway.



Two hours of lubrication work at midday is part of the field routine for maintenance men of Alley Construction Co., Inc., Faribault, Minn. The 1-hour lunch break for operators is staggered. In this lineup are a Cat D8, a Michigan 280 rubber-tire tractor, a dozer, and a TC-12 pusher. In addition, the crew checks oil, battery, and tires. The 7-reel lube van, built with plywood sheeting to keep dirt out, has hoses for grease, weights of oils, compressed air and torque fluids.

The local State the oilers ad to help lubri

The job r ment. At on Cat DW20 ac engine scrap pushers, and were at work tire dozer ro cellaneous pushing scrap fill, the con sheepfoot r matic roller, brating rolle tion, there v crane. A Lin pipe laying.

## Equipme

There is p can break seldom out assisted by remedies m breakdowns man. He divi job and two state. Practi spent in th that good m followed. W moved from supervises th With the Ralph keeps record of th piece of eq report reco (each mach hour meter) and the rep machine ba

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Each mechanic has his own pickup. Master mechanic Martin Gardner in selecting a tool from a chest mounted on the Powers body of the Ford 3/4-ton pickup. The other side holds parts. Cutting and welding equipment are also carried.



During the lunch break, a mechanic welds a foot on a Bros leveling sheepfoot roller to get it back into action as fast as possible. A Miller 350-amp welder, pulled by the mechanic's pickup, supplies the power. The roller carries a heavy steel blade to help level the fill.



Flying dust was the Number One enemy of the maintenance crews on the 10-mile grading contract near North St. Paul, Minn. But trouble was virtually nonexistent for the well kept spread. The Michigan 280 is standing by to help load a DW20 that is kicking up clouds of dust.

CONTRACTORS AND ENGINEERS





The local Standard Oil distributor adds diesel fuel to the tank of a D8 while one of the oilers adds a few shots of oil to the tank. Sometimes, oil is added to the fuel to help lubricate the valves.



The grease crew takes time out after the noon rush. All of the maintenance men are topnotch mechanics and lubrication men, well trained and well paid, and they stick with Alley Construction.

The job requires a lot of equipment. At one particular time, nine Cat DW20 scrapers, two Euclid twin-engine scrapers, three Euclid TC-12 pushers, and three motor graders were at work. A Michigan 280 rubber-tire dozer roved the job doing miscellaneous work and occasionally pushing scrapers. For compacting the fill, the contractor had four Bros sheepfoot rollers, a 50-ton pneumatic roller, and three new Bros vibrating rollers. For swamp excavation, there was a Bucyrus-Erie 54-B crane. A Lima  $\frac{3}{4}$ -yard rig handled pipe laying.

#### Equipment super is busy man

There is plenty of equipment that can break down, but the rigs are seldom out of action. Ralph Jolitz, assisted by his well trained crews, remedies most of the trouble before breakdowns happen. Ralph is a busy man. He divides his time between this job and two others under way in the state. Practically all of his time is spent in the field. He makes sure that good maintenance practices are followed. When equipment has to be moved from one job to the next, he supervises the operation.

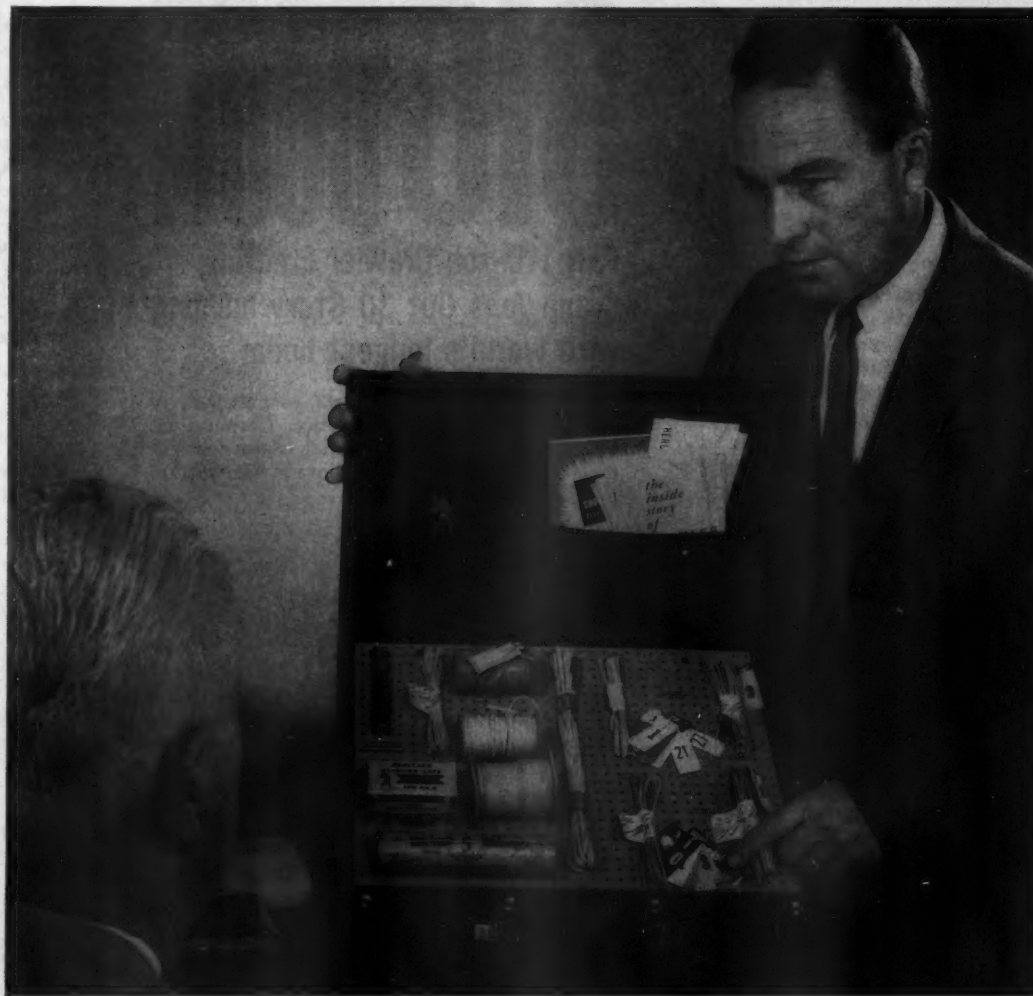
With the help of the timekeeper, Ralph keeps a weekly and monthly record of the performance of each piece of equipment on the job. The report records the hours it worked (each machine is equipped with an hour meter), its hours of downtime, and the repairs needed to get the machine back in operation.

Looking over the report for a particular month, Ralph singled out the company's oldest dozer—a Cat D8 with 12,074 total hours on it. "Down only 14 hours in the 215 hours that it worked during the month," said Ralph proudly. "Let's see now, that's about 93 per cent availability. Not bad for an old dozer."

The company's newest dozer, another D8, was down only  $1\frac{1}{2}$  hours for a service check during the 215 hours that it worked, giving it 99 per cent availability.

On the job, the equipment works 16 hours a day from 7 a.m. to 6 p.m. The oilers and mechanics work on the rigs for two hours at noon and again for several hours at the com-

(Continued on next page)



## HAVE YOU SEEN "THE MAN WITH THE RED VALISE"?

Every Hercules Explosives technical representative carries "The Red Valise" you see above. In it are dummies of Hercules® Blasting Caps; with it in front of you, you and the Hercules man can determine the best materials for your specific requirements.

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good idea. He's been expertly trained in his field, and backing him up is a complete line of quality materials for the industrial explosives user. You can always receive the help you need from Hercules, either by contacting the Hercules sales office nearest you or by writing direct to Wilmington.



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For more facts, use Request Card at page 18 and circle No. 273





Two Goodyear 28-ply tubeless nylon tires and a Firestone 20-ply airplane tire, for use on a motor grader, are chained beside a van containing drums of grease and oil, and equipment for testing fuel dilution in used oil drawn from crankcases.

(Continued from preceding page)

pletion of the shift. The operators of one spread of equipment take their lunch hour from 11:30 a.m. to 12:30 p.m. The operators of the second spread take their lunch in the following hour. This gives the maintenance men two full hours to go over the equipment.

#### Neontime is work time

When the operators grab their lunch buckets, the oilers grab their guns. Working from a well equipped lube truck, the men systematically go over each piece of equipment. They grease wear plates and critical fittings. They check batteries, cables, and tires. When necessary, they change oil and filters. (This is done every 100 hours of operating time.) Fueling of the rigs is done from a tank truck by a local distributor. Under the supervision of lube technician Elmer Mallon, the 3-man crew makes sure that the machines are in top operating shape.

The two hours at noon are also a busy time for master mechanic Martin Gardner and the two other mechanics on the job. Each mechanic works from a pickup truck equipped with welding and cutting equipment. They check over the equipment for impending mechanical failure. They make adjustments on master clutches and power-control units. They check wear on rollers and sprockets so that these can be built up before they are too badly worn. The alert mechanics repair any number of things that may eventually cause a breakdown. During the hours when the equipment is working, one mechanic usually patrols the job keeping his eye out for machines in distress.

Although most of the actual work is done in the field, the base of operations for the maintenance crews is the yard area. Conveniently located on the job, the area contains a mobile van for storing some \$20,000 worth of parts, a small steel warehouse for miscellaneous items, and a storage van for greases and oils. Also in this area is the field trailer office.

Spare tires for earthmoving equipment are stored in the yard. Since local dealers don't stock the big tires,

Alley Construction Co. finds it saves time to keep new ones on hand.

One of the storage vans holds equipment for testing used oil for fuel dilution. On every oil change, the lubrication technician takes a sample of the old oil and tests it for fuel dilution. If too much fuel is getting into the oil, the engine will be overhauled. As a result of this maintenance policy, machines are seldom down because of engine failure.

In greasing the equipment, the contractor normally goes by the manufacturer's recommendations. Six different types of oil and two types of

grease are kept on hand for lubricating the various machines.

Practically all the engines on the machines are equipped with dry-type cleaners. The company has found that this type of cleaner is simpler to use than the oil-bath cleaner.

Alley Construction Co. takes care of its equipment, and the equipment takes care of the company. With very little down time, the rigs are making money for the contractor more than 90 per cent of the time, they are assured of a long life, and—when the time comes for a trade-in—they will command good prices.

# 310 FOOT BOOM

## P&H 110-ton Crawler Erecting Crane Tops Out 30 Story building with world's longest boom

Here's a construction "first" established by Chas. V. Castaldo Construction Corporation, Bronx, New York, in the erection of the new Imperial House apartment buildings in Manhattan.

With this P&H rig, they started with a 200' boom for the first 15 floors. Using a 3 yd. concrete bucket, they averaged 60 cu. yds. per hour by handling a load every 3 minutes! ... a pretty fast pace in the middle of Manhattan! All work motions being independent of each other really counted in producing the speed needed for this fast pour.

For the 16th to the 21st floors, 50' more boom was added—total boom length—250'. For an average pour, let's take the 20th floor: 42 cu. yds. per hour with a 3 yd. bucket! This was possible because of Magnetorque® swings which speeded up the entire work cycle through faster, frictionless swings. (Even later at 310 feet up there was no "fly-rod" action and boom side stress was

greatly reduced). The 1015 has no linings to replace ... no adjustments or maintenance are necessary. Think of the time Castaldo saved on this one P&H feature alone!

They weren't through yet! A 50' jib was the next addition for pouring from the 22nd to 29th floors—total now: 300' boom. Here they handled 2 yds. of concrete with a typical output average of 37½ cu. yds. per hour.

Finally, to top out everything, another 10' jib insert was added. It was used to pour at the 29th and 30th floors and penthouse ... an unequalled 310' of boom pouring 1½ yds. of concrete with an average output of 35 cu. yds. per hour.

Safety was a prime characteristic of the entire operation through the independent planetary boom hoist with single directional cam clutches which provided "triple-safe" operation.

Equally important to Castaldo's work is the mobility of this outstanding rig. The morning after the job was finished, the boom was dismantled and the machine loaded on trailers by 10:00 a.m., moved across town and set up with 250' of boom ready for a new project by 5:00 p.m., the very same day.

Castaldo's many jobs also call on the ability of the 1015 to lift 110 tons with a basic 50' boom, at a practical 15' radius.

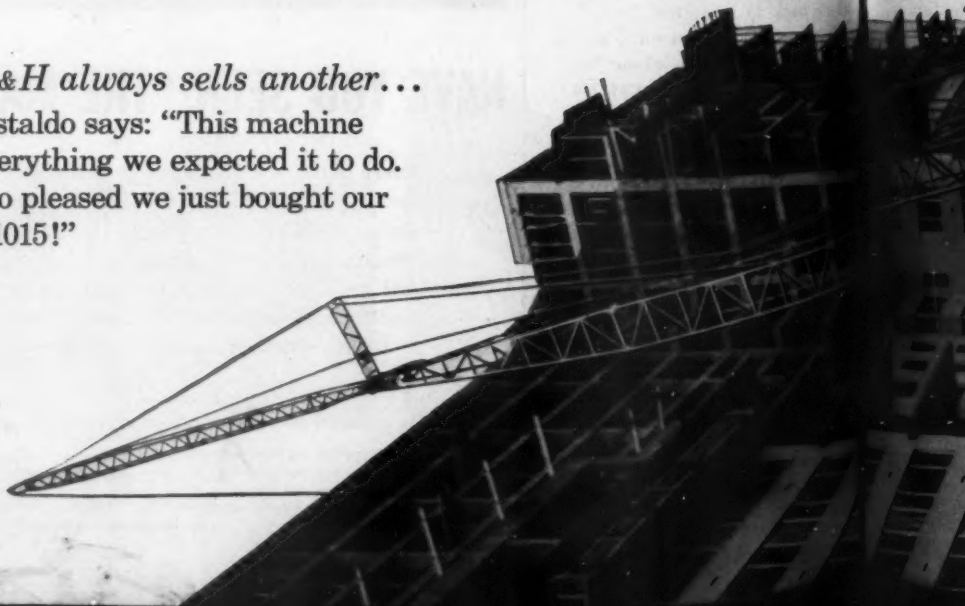
Between this 110-ton crawler erecting crane and the 12½ ton Heavy Duty Miti-Mite—regardless of your capacity needs—Harnischfeger has a crane to do your job faster and at a lower cost. For more information, just mail the coupon to Harnischfeger Corporation, Construction and Mining Division, Milwaukee 46, Wisconsin.

**HARNISCHFEGER**  
Milwaukee 46, Wisconsin

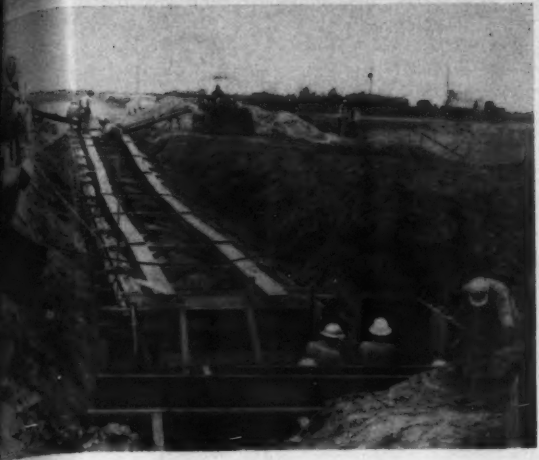


One P&H always sells another...

Mr. Castaldo says: "This machine does everything we expected it to do. We're so pleased we just bought our fourth 1015!"







**PREFABS FORM A FUEL TROUGH** at Offutt Air Force Base in Nebraska. At this and two other operational missile sites, the concrete subcontractor J. Hilding Johnson, Inc., Gary, Ind., used 118,000 square feet of Symons Steel-Ply panels for the power and pump building, operations building, three no-gantry-type launchers, and two remote stations for tracking the rockets in flight. About 12,000 cubic yards of concrete was used at each site.

### THIS IS MAGNETORQUE

Precision control through Magnetorque swings eliminates whip on this job, reduces boom side stress—no linings to burn out or replace . . . gives better acceleration and deceleration for consistently better production.

### 3-HOUR TAKE-DOWN!

That's all Castaldo required—even with 250 feet of boom and 60 feet of jib. 3 hours after start, everything is down, trailer loaded, ready to move to the next job. Low, overall height (13 feet with gantry in folded position) simplified transporting and operation in restricted areas.

**Hamischfeger Corporation, Construction & Mining Division,**  
4400 West National Avenue, Milwaukee 46, Wisconsin

- ☐ Would like a copy of the case history of this 110-ton P&H 1015 working on the Manhattan project.
- ☐ Send along literature, specifications and additional information on this 110-ton rig.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

### Develop new method of prestressing concrete with glass fibers

■ A method of producing concrete structural elements reinforced and prestressed by glass fibers has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

The method, which has been patented, was developed by Solomon Goldfein, a chemical engineer who is chief of the plastics section in the materials branch of the laboratories.

One of the difficulties involved in producing such structural elements has been the problem of securing adequate bond of the glass fibers to concrete. The new method solves the problem through the use of a binder, such as an epoxy resin, which has been specially formulated to bind the glass fibers to themselves and to the concrete.

Several methods can be used in the work. One employs a prefabricated plastic glass-fiber rod having a silicious or cementitious covering on its surface. The rod is embedded in concrete, and the covering acts to increase the strength of the bond between the glass fibers and the concrete. Under the other method, glass-fiber-impregnated plastic embedded in the concrete hardens during the setting of the concrete, thus effecting a bond. The rods may be prefabricated with special gripping devices bonded to them for tensioning.

The material will not compete with steel, because of its low modulus and high cost. The former disadvantage, however, is expected to be reduced by the use of a special glass fiber that has a modulus almost equal to that of steel. The price differential will lose some of its significance in countries having no iron resources but plenty of glass-making raw materials.

The method is expected to be used in special applications where light weight, corrosion resistance, the absence of a magnetic field, and electrical resistance of the reinforcement are important factors to be considered. The structural elements might, for instance, be used in piling for docks exposed to salt water, in structures needing reinforcement that must not conduct electricity, and as reinforcement for large concrete water pipes.

### Carl C. Crane adds concrete specialist

■ Norman H. Withey has joined Carl C. Crane Inc., Madison, Wis., consulting engineering firm, to work largely on concrete technology and engineering.

Withey will concentrate on concrete-mix design and control testing for concrete and cement-products manufacturers, and he will review concrete and masonry portions of specifications and plans for architects, engineers, or contractors.

Work on 5,898 miles of the Interstate System has been completed at a cost of \$2.42 billion since July 1, 1956.

—For more facts, use coupon or circle No. 274







Two Lorain 20-ton cranes work at different levels to construct the falsework for the 2-level approach to the Lake Washington Ship Canal Bridge in Seattle. The Lorain on the first deck of the falsework swings a timber stringer into place; the crawler in the background is setting timber caps.

Work on high approach structure  
for bridge demands that contractor's

## Motor cranes travel on timber falsework

The construction of the north approach section of the Lake Washington Ship Canal Bridge in Seattle, Wash., has been attracting a great deal of attention for several reasons. One is the unusual concept and design of the structure, which provides 12 traffic lanes on two levels, with four of the lanes being reversible for peak-hour traffic.

The ingenuity of the contractor, MacRae Bros., Seattle, accounts for most of the other interesting features. MacRae started by drilling holes for the falsework piling, then building a timber shoring system—partly double decked—to support the heavy concrete box-girder deck sections.

To facilitate high-level operations, two Lorain 20-ton motor cranes were set up on special platforms on the first-deck falsework so that they could easily reach to place the higher falsework timber and to bucket concrete to the forms.

The use of a Rex Railporter system for the placement of the deck-slab concrete and Clary power screeds for the finishing drew the attention of even casual passers-by. Less spectacular features, such as the welding of heavy reinforcing bars and the use of more than 3,500 pairs of big timber wedges, caught the eyes of those who looked closer.

### Lanes are reversible

This \$1.84 million contract is just one of several phases in the construction of the Lake Washington Ship Canal Bridge, a \$16 million project. The bridge is a vital link in the Seattle Freeway, which will extend 20 miles through Seattle and is estimated to cost \$175 million. It is a part of the Interstate System.

A 7-mile portion of the Freeway, including the bridge, has been designed as a 12-lane freeway with four reversible lanes. This will provide eight lanes in the direction of peak flow, morning and evening. The twelve lanes are broken down into three separate roadways of four lanes each. The reversible roadway is a separate freeway, lying between the other two roadways but not connected to them except at the ends.

A high-level cantilever steel bridge is being built over the Lake Washington Ship Canal. It will carry two 4-lane one-way roadways on an upper deck that cantilevers over the outside of the piers. The reversible roadway will be on a lower deck between the pier columns.

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This special tool was used to lower the slab into the water. The bottom slab and the lower slab are shown.

The north structures to transition from the double-deck also include some. These approaches are essentially reinforced concrete girders carried on columns. They led to some problems.

#### Box-

A typical section of the deck is a 3-span structure with spans of 90 and 100 feet. It is 8 feet deep and bottom flanges are spaced at approximately 10 feet. Web thickness is 12 inches. The top slabs are 12 inches thick. The face of the structure is 20 feet above the water surface.

MacRae's contract provided for the placement of 10,000 cubic yards of concrete, 10,000 pounds of reinforcement, and is scheduled for completion in August.

The contractor used forms for the concrete columns and placed the concrete in the forms.

#### Drill for

Then the contractor made a time schedule for the forms for the ground was 10 feet deep. The pile driving contractor chose to drill 12-inch Ka-Mo by an Elmer and the boom of the hydraulic crane; the contractor supplied the rig.

This rig was used to depths ranging from 10 to 20 feet on the location of the soil. A concrete was placed in the bays bearing concrete had several Lorain the timber frame the workmen (C)





This special tool was designed to bend the web-wall bars over into the slab after the lost soffit forms for the top slab had been placed. The bars had been left straight to facilitate work on the lower slab and web walls.



Ahead of the cranes erecting shoring and forming is this Austin-Western hydraulic crane that handles the Ka-Mo drill putting down holes for the piles. The drill is powered by an Elmco air motor; air is supplied by the Jaeger 600-cfm compressor.



Form sections are prefabricated in this form yard, where cutting chores are done by a De Walt radial arm saw and Black & Decker portable hand saws.

The north and south approach structures to the bridge provide the transition from the normal section to the double-deck bridge section. They also include some on and off ramps. These approach structures are essentially reinforced-concrete box girders carried on heavy cruciform columns. Their transitional function led to some intricate forming problems.

#### Box-girder design

A typical section of the box-girder deck is a 3-span continuous unit with spans of 90 and 120 feet. The girder is 8 feet deep with 6 to 7-inch top and bottom slabs and with webs spaced at approximately 8.5-foot centers. Web thickness ranges from 8 to 12 inches. The finished surface of the top slabs becomes the riding surface of the roadway. Where the structure is double decked, the clearance above the lower deck reaches some 20 feet.

MacRae's contract provides for the placement of nearly 18,000 cubic yards of concrete and 5 million pounds of reinforcing steel. The work got under way in March, 1959, and is scheduled for completion this August.

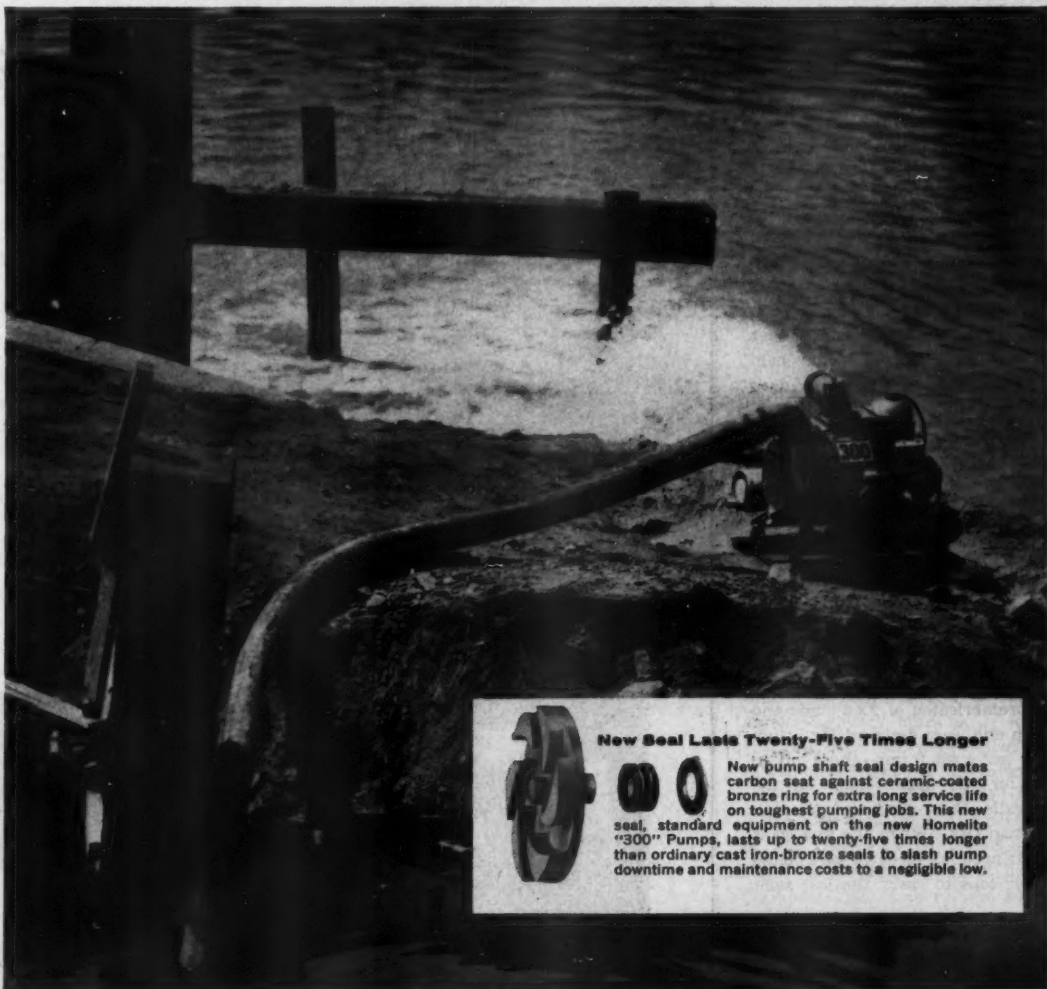
The contractor used plywood-faced forms for the big tapered cruciform columns. Cranes and buckets placed the concrete.

#### Drill for falsework piles

Then the crews began setting the mass of timber falsework to carry the forms for the girders. Since the ground was hard enough to make pile driving difficult, the contractor chose to drill holes for the piling. A 12-inch Ka-Mo auger drill powered by an Elmco air motor was hung from the boom of an Austin-Western hydraulic crane; a Jaeger 600-cfm compressor supplied the air.

This rig quickly bored the holes to depths ranging to 8 feet, depending on the location and bearing value of the soil. A small amount of concrete was placed in each hole to provide bearing for piles. When the concrete had hardened, one of the several Lorain cranes on the job set the timber falsework piles in place as the workmen spiked on the system

(Continued on next page)



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of horizontal and diagonal bracing made up of 3-inch planks.

Each falsework bent was capped with a 12x14-inch timber cap usually extending 24 to 36 feet over three or more piles. Timber stringers ranging from 6x16's to 9x18's spanned between the pile bents to support the 4x4 joists of the lower slab form. These 4x4's were spaced about a foot apart and were laid loosely except for the ones falling at the ends of the plywood sheets. To complete this form, crews placed full sheets of 3/4-inch plywood over the joists.

#### Wedges provide adjustment

Pairs of big wedges were placed between the pier caps and the stringers to provide the adjustment necessary for stripping. These wedges were made from 6x12 and 8x12 blocks 16 inches long ripped diagonally. More than 3,500 pairs were supplied for the job directly from a mill.

On single-level portions of the structure, the wedges served to adjust the forms to grade and then to lower them away from the concrete for stripping. In the 2-level portions they served an additional purpose. After the concrete had cured, the wedges under the lower-deck box girders were first loosened to apply the dead load to these girders. Then they were tightened up again so that the lower-deck shoring could help carry the load of the upper-deck forms and concrete.

When the form for the bottom slab of a box girder was in place, the reinforcing steel was set and the concrete placed. Concrete was bucketed from transit mixers to the forms in 1/2 and 1-yard Gar-Bro buckets by one or more of the Lorain cranes. The mix was vibrated, screeded to grade, and finished by hand floats.

Forms for the web walls and diaphragms were then set. These forms were prefabricated of 2x6 studs and shiplap and were designed for re-use as the lost soffit forms—those left in place for the upper slab. In the web walls, they were tied through with snap ties. When the web walls were stripped, 4x4 ledgers were bolted to their tops to carry the lost soffit form.

Concrete for the top slab of the



Screeds for the top slab of the box girders—the riding surface of the bridge—are of 1 1/2-inch-square steel tubing, on adjustable supports. Each support has a Y-shaped top with a 1/2-inch threaded rod that fits into a 1/2-inch pipe sleeve.

box girders was placed by a Rex Railporter system and finished by Clary power screeds. This provides the finished roadway surface.

For this operation, two shop-built hoppers were set up at one end of the deck. The Railporter rails, extending from under these hoppers, ran the full length of the section to be placed. One of the cranes bucketed concrete from transit mixers to the two hoppers from which the Railporter cars were filled. The self-powered cars traveled down the rails to the point of placement. As the work progressed, successive sections of track were removed.

Special screed bars and supports and a pair of Clary power screeds finished the top slabs to proper line and grade. The shop-made screed

supports consisted of 1/2-inch threaded rods with Y-shaped tops to engage the 1 1/2-inch-square tubular steel screeds. The threaded rods slipped into short pieces of 1/2-inch pipe, and a nut was used to adjust to grade. As the screeds were removed, the threaded rod and the nut were also recovered; the only lost item was the short piece of pipe. The screeds were located directly over the girder web walls so that the supports could bear on the concrete of these walls instead of on wood forms.

These rigid screeds provided good tracks for the Clary screed machines that finished the slabs. The Rex Railporter system was supplied by Air Mac, Inc., Construction Equipment Division, Seattle. The Clary screed machines were supplied by

Caldwell Machinery Co., Seattle.

#### Cranes ride the falsework

On the double-deck portion of the structure, the falsework was first built up to the lower-deck level to support the forms for the lower-deck box girder. Since the upper deck was to be much wider than the lower, it was feasible to construct some of the falsework for the wider portion of the same time as the lower-deck falsework was being built. This provided a platform on each side of the structure at the lower-deck level.

Using a pair of 30 and 20-ton cranes, the contractor lifted one of the 20-ton Lorain motor cranes onto this platform on each side of the structure. These cranes were able to travel more than 300 feet along

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# WHICH EXPLOSIVE?

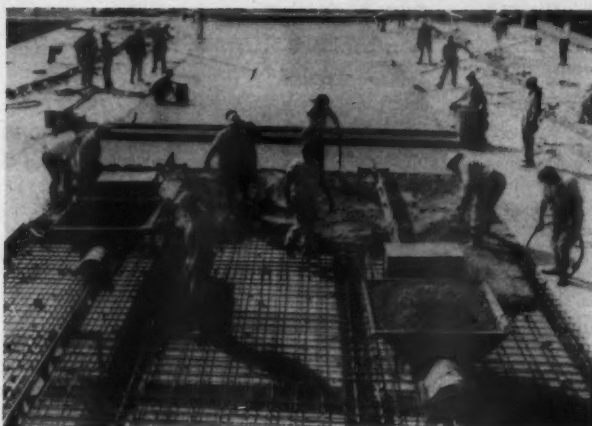
This is a photographic enlargement of Atlas Pellets.







Railporters are being used to bring concrete to crews on the deck. One crane and the dump man on the platform keep the shop-built hoppers filled with transit-mix concrete. After the Railporters fill their buckets with con-



crete, they move out to the dumping and vibrating crews. Clary power screeds are being used to finish the slab. Sections of rail for the Railporter were removed as placement progressed. These have been strung out on the deck.

New explosives, blasting agents, and techniques are being developed at an ever increasing rate. Operators are using these developments to find new answers to the old problems of getting more payload work from shovels, trucks, crushers, conveyors . . . all their equipment all along the line. And they are finding that the lowest true blasting costs depend upon determining *which explosive* and which blasting methods combine to give the best breakage, displacement, and control at the lowest overall cost.

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## ATLAS EXPLOSIVES

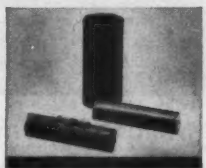
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and forth on the platform, and they could easily reach areas inaccessible to cranes working from ground level beside the structure.

When the box girder for the lower deck was completed, a timber falsework system was set on this deck to support the upper-deck forms. The falsework under the lower deck was also left in place after being adjusted so that the lower girder assumed its own dead load. The upper deck was then formed in the same manner as the lower; concrete placement was also similar.

A number of No. 14 and No. 18 reinforcing bars in the bottom slabs of the box girders were required in lengths up to 160 feet. Since the longest bar that could be delivered to the job was 107 feet, the bars were spliced in the field by welding.

One workman, who was previously qualified for this operation, made all of the welds. He first cut the ends of the bars to a 45-degree bevel and then built up the weld with successive passes made with an electric arc. This welding operation was done right in the forms with the bars lying in their approximate final positions.

In another uncommon operation, the contractor bent hundreds of the vertical web-wall stirrups after the soffit forms for the upper slab were in place. These bars projected straight up where they were least in the way during the forming and placement of the lower slab, web walls, and diaphragms. Then, after the top-slab soffit form was in place, a workman bent the bars down to fit into the top slab. This one man used a special bending tool that bent the bars quickly and accurately with a minimum of effort.

### Requires plenty of timber

If this job were not in an area where timber is plentiful and where the lumber industry bulks large in the economy, the shoring system employed on it might not have been economical. In the Pacific Northwest it was both economical and practical. It did require large quantities of timber and lumber products, including some 1,500 timber piles, 800,000 board-feet of timber (mostly 3-inch timbers and larger), a million board-feet of dimension lumber and ship-lap, and 160,000 square feet of 3/4-inch form plywood.

### Personnel

MacRae's supervisory staff includes project manager Ralph Finke, superintendent George H. Ongman, project engineer "Lab" Hartfield, and office manager Hugh Stephens. For the Washington Department of Highways, Ed A. Wilkerson is resident engineer; Bob Bernard, assistant resident engineer; Clarence Woodcock, party chief; and Bill Schultz, inspector in charge.

Work on the Seattle Freeway is all handled through District 7, with W. E. McKibben serving as district engineer. W. A. Bugge is director of highways for the State of Washington.

THE END





A Koehring 34-E, followed by a Worthington 34-E, leads the train that puts down more than 1,600 linear feet of pavement per 8-hour day for the new instrument runway at New York International Airport.



Two Maginnis vibrators on the Blaw-Knox spreader work adjacent to the forms to consolidate the concrete. They are powered by a generator on the rear platform of the spreader.



A Rex double-screed transverse finisher rides the rails as it follows the spreader, smoothing out the surface of the 12-inch unreinforced-concrete runway slab.

## Concrete spread moves for new

An average of over 1,600 linear feet of paving was handled per 8-hour day by the twin-paver spread working on the \$12 million instrument runway at New York International Airport. The runway, built by The Port of New York Authority, is 8,400 feet long and 150 feet wide, and is located parallel to and 3,000 feet east of another instrument runway.

The dual parallel system makes independent landings and takeoffs possible during instrument weather conditions, and it is estimated that the new facility will double the airport's instrument weather capacity, enabling it to accommodate 80 to 100 movements per hour.

### Subcontract paving

The Port of New York Authority, operator of the airport, awarded a \$6,046,969 contract to Tufano Contracting Corp., and O & E Contracting Co., Inc., Flushing, N. Y., a joint venture. Its job included paving and extensive utility installation for the new runway. The joint venture immediately got busy removing and grading the surcharge fill placed over the runway alignment under a previous contract.

The concrete paving was subbed to the John C. Peterson Construction Corp., Baldwin, N. Y., which started paving operations even before the grading phase of the project was completed.

### Two pavers

Peterson moved in with a well-knit paving spread and an experienced crew. Two pavers led the train—a Koehring 34-E and a Worthington 34-E—dumping the mix in front of a Blaw-Knox spreader. The paving contractor placed enough concrete to complete the 12-inch unreinforced runway slab with a single pass of the spreader. Paving was done in 25-foot widths.

The spreader was equipped with two Maginnis vibrators at the rear, adjacent to the concrete forms. The vibrators assured proper consolidation of the concrete along the slab edges where keys were formed by form inserts.

A Rex double-screed transverse finisher followed the spreader and prepared the surface for the insertion of steel fillers to form the transverse joints. The 3-inch fillers were placed manually by three men, one on each side of the lane and one on a rolling platform at the center. They used a special frame to hold and sink the fillers in the concrete. Fillers were placed on 20-foot centers and on each side of the 13-foot-long box openings formed in the slab. These openings were formed to house the electrical system for the runway approach lights.

This crew was followed by a Rex belting machine, riding the 12-inch steel forms and equipped with a 12-

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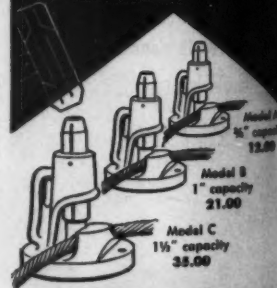
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APRIL, 1960



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inch-wide belt in front and a burlap drag in the rear. It literally pushed the belt and pulled the drag over the concrete surface as it moved forward. After the belting machine made its pass, a crew removed the 3-inch transverse fillers and then dressed up the joint.

## Forms set

Peterson had to maintain forms a minimum of 500 linear feet ahead of the lead paver at all times. This was always exceeded; enough forms were always in place for a day's work.

Stakes securing the forms to the 6-inch compacted-stone base course were driven by an air hammer pow-

ered by a Le Roi Tractair self-propelled compressor. A Pettibone Mulliken grader, equipped with 25-foot Roadgrader Gauge blade extensions riding the forms, trimmed the base-course material. Final compaction was handled by a Gallion 10 to 12-ton tandem-wheel roller.

## Curing and sawing

Peterson subbed the curing operations, as well as the sawing of the longitudinal joints, to Master Waterproofers, Inc., Long Island City, N. Y. One man used an Aeroll portable spray machine to cover the freshly placed slab with Permite white-pig-

(Continued on next page)



A specially built frame is used to hold and position the 3-inch steel fillers for the transverse joints. They turn the frame upside down to drive the filler into the concrete.



A Rex belting machine, pushing a 12-inch-wide belt and pulling a burlap drag, finishes the slab surface. A Cat scraper continues on the earthmoving phase of the job even as paving is being done.



Windsor and Clipper portable saws cut the 3-inch longitudinal joint. The lead saw uses an abrasive blade to start the joint; the second saw uses a diamond blade to bring the joint to its 3-inch depth. This procedure cut down wear on the diamond blade.



Permite white-pigmented compound is sprayed onto the slab surface by a workman with an Aeroll portable spray machine. On the following day, workmen will strip the forms.

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A Pettibone Mulliken grader with Roadgrader Gauge blade extensions trims the base course material within the 12-inch forms. Compaction of the 25-foot width is handled by the Galion tandem roller.

(Continued from preceding page)

mented curing compound. This same man, plus a helper, sawed the 3-inch longitudinal joint down the center line of each 25-foot lane.

The joints were cut with two portable machines—a Windsor and a Clipper—powered by Wisconsin gasoline engines. The first used an abrasive blade to cut about half the prescribed 3-inch depth, while the second machine used a diamond blade to complete the joint. This combination of abrasive and diamond blades

helped increase the life of the diamond blade. The joints, transverse and longitudinal, were later filled with an asphaltic filler.

#### Personnel

Michael Adamowicz was in charge for Tufano and O&E; Carmelo Mazzotta was the superintendent for Peterson. Joe Hoermann is the resident engineer for The Port of New York Authority at New York International Airport.

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The rugged Clipper 36 H.P. Model C-363, best ever built for production performance on highways, airfields — heavy trenching jobs. One of many Clipper saws for every job — every budget!

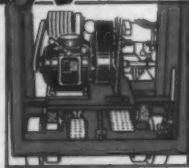
## AND HERE'S HOW *Clipper* BUILDS THEM...



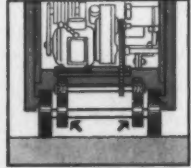
Our engineering staff really outdid themselves with Dual Balance Design—which simply means that this Big Saw is so perfectly balanced that one man can easily handle it. The engine weight is over the blade, preventing blade "ride-out". It's easier to use than any other saw—another reason why 4 out of 5 Buy Clipper!



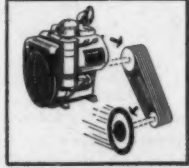
Only the most accurate blade feed was good enough for us, so we originated Ball Bearing Positive Screw Feed... which gives you positive control of the blade at all times... and enables you to keep abrasive blades at the proper cutting depth as they diminish in diameter. No other method... not even hydraulic... gives such complete blade protection.



We bring you the most powerful Heavy Duty Transmission ever used on a concrete saw. To it we've added abrasive coated drive wheels (ours only) which transmit smooth continuous power and propel this rugged saw through the toughest jobs at speeds up to 26 feet per minute. Another reason why it's the fastest saw ever built!



Solved! The problem of curing compound buildup on the drive wheels. We added two Separate Contact Wheels which never touch the pavement and operate right off the transmission drive wheels. Result? Continuous operation without downtime for wheel clean-up. A good example of our experienced know-how, which means more practical, efficient equipment for you.



Selection of component parts gets the same intelligent thought given the design of Clipper Saws. That's why we chose the dependable proven 36 H.P. Wisconsin Engine, then added 6 reinforced V-Belts to give 100% sure power delivery. That's why we can guarantee that no other saw can match Clipper!

**ONLY CLIPPER CONCRETE SAWS ARE... Unconditionally Guaranteed TO CUT FASTER—HANDLE EASIER and GIVE MORE FOOTAGE PER BLADE THAN ANY OTHER SAW!**  
**THE CLIPPER MANUFACTURING CO. — 2803 East Warwick — Kansas City 8, Missouri**  
 Sold direct from Clipper offices and warehouses coast to coast. • Call your Factory Trained Representative for Free Demonstration,

For more facts, use Request Card at page 18 and circle No. 283

#### Award made to Ellsberg for concrete achievement

■ Harry Ellsberg, chief structural engineer for Giffels & Rossetti, Detroit, has received the 1950 Concrete Achievement Award, sponsored by Huron Portland Cement Co. on behalf of the Concrete Improvement Board of Metropolitan Detroit.

The engraved plaque was presented to Ellsberg for his efforts in promoting specifications and quality concrete in various projects, including Cobo Hall and the new U. S. Post Office Building in Detroit. Ellsberg is currently chairman of American Concrete Institute Committee 623, Formwork for Concrete.

#### Yale promotes two

Newcombe C. Baker, Jr., has been made manager of marketing services and J. Henry Brown is now advertising, publicity, and sales promotion manager for The Yale & Towne Mfg. Co.'s Yale Materials Handling Division in Philadelphia.

Baker joined Yale in 1953 as special sales promotion manager and was responsible for the Yale Traveling Road Show. He was made manager in 1954. In his new post, Baker will supervise advertising, sales promotion, and market research for the division, which makes industrial lift-truck, truck-shovel, and hoisting equipment.

#### Warehouse and office opened by Symons

A new warehouse and office facility has been opened in Baltimore by Symons Clamp & Mfg. Co.

The new operation is headed by Warren Sennecke, a veteran member of Symon's Chicago city sales staff. He is assisted by Lou Boldt. The office, located at 1415 Parkley Ave., serves an area consisting of Washington-Arlington, nearly all of Maryland, and two counties in Delaware. The new warehouse carries a complete stock of Symons forms, column clamps, hardware, and accessories.

The cost of raising vertical clearances for structures on the Interstate System from 14 to 16 feet is estimated at \$925 million.

CONTRACTORS AND ENGINEERS

ACI elects  
as president  
Prof. J. W.  
dent of the A  
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last month a  
in New York  
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vice president  
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APRIL, 194



## ACI elects J. W. Kelly as president for 1960

Prof. J. W. Kelly was elected president of the American Concrete Institute at its 56th annual convention held last month at the Hotel Commodore in New York City.

Raymond C. Reese was elected a vice president. Lewis H. Tuthill begins his second year as an ACI vice president. Reese is a consulting engineer in Toledo, Ohio; Tuthill is a concrete engineer with the Division of Design and Construction, California State Department of Water Resources, Sacramento.

Four men were elected to start 3-year terms on the Board of Directors. They are A. Allan Bates, Bruce E. Foster, Ben C. Gerwick, Jr., and James A. McCarthy.

Prof. Kelly, who teaches civil engineering at the University of California, previously served two years as vice president. A member of the Institute since 1926, he has been active in its affairs throughout the years; currently he is a member of the Standards Committee and ACI Committee 611, Inspection of Concrete. Following graduation from Purdue University, Kelly was engaged in waterworks engineering, served as assistant in the testing materials laboratory at Purdue University, and was on the staff of the Portland Cement Association. He joined the staff of the Engineering Materials Laboratory at the University of California in May, 1931.

Continuing on the Board of Directors are Arsham Amirikan, Bureau of Yards and Docks, Department of the Navy, Washington, D. C.; S. J. Chamberlin, Iowa State College, Ames; Roger H. Corbetta, Corbetta Construction Co., New York City; George C. Ernst, Dunmire & Ernst, Lincoln, Neb.; E. A. Finney, Michigan State Highway Dept., East Lansing; Bryant Mather, U. S. Army Corps of Engineers, Jackson, Miss.; Walter J. McCoy, Lehigh Portland Cement Co., Coplay, Pa.; and Cedric Willson, Texas Industries, Inc., Fort Worth.

## States consider controls on licensing teen-agers

Efforts are being made to raise the minimum licensing age or to place restrictions on young operators of motor vehicles, in at least eight states.

A bill that makes it optional for populous counties to bar drivers under 18 has been passed by the Virginia legislature and signed by the governor. Virginia law currently permits licenses to be issued to 15-year-olds. A proposal in New Jersey would prohibit solo driving for persons under 18.

Bills in Kentucky, Massachusetts, Michigan, Rhode Island, and New York would restrict or prohibit 17-year-olds from driving at night. New York would require the presence of a licensed parent or guardian. Present law does not specify the relationship of the adult.

In Arizona, the House has passed a measure to bar further issuance of restricted motor-scooter licenses to 14 and 15-year-olds.

## Johnson names engineer

John S. Shapland has been appointed chief engineer of the C. S. Johnson Co., a division of Koehring Co., Champaign, Ill. Shapland will be in charge of all engineering for the company, including new developments in electronic batch-control systems, standardized high-capacity paving plants, and ready-mix concrete plants.

## Twin Disc expands

Twin Disc Clutch Co., Racine, Wis., has established a new transmission engineering department at its Hydraulic Division plant in Rockford, Ill. This department will undertake the design of torque-converter-

equipped power-shift transmissions for the industrial market. The company plans to produce a complete line of these units from 80 horsepower up, for application in all types of industrial vehicles.

The chief engineer of the new department is Joseph B. Snoy. Working with Snoy on the transmission projects are his brother, Frederick, and Basil White and Michael E. Gill.

## B-G sales appointments

Dale Fisher has been appointed to head the spreading-equipment sales section of Barber-Greene Co., Aurora, Ill. He succeeds G. Richard Lundberg, who has been appointed a district sales manager for the firm in Seattle, Wash.

## Firestone opens plant in Europe; plans another

Production operations are now underway at The Firestone Tire & Rubber Co.'s new plant in Alcochete, Portugal. Annual production capacity is expected to reach 120,000 truck and passenger-car tires and tubes. The new company is known as Firestone Portuguesa.

Pierre J. DeLarosiere has been named managing director of the new firm. George W. Thorsby is plant manager at Alcochete, and Vincent A. Morris is production manager.

Firestone plans to build a multi-million-dollar plant in Bethune, France. The one-story tire plant, located on an 81-acre site, will be completed late this year.



## RELIABLE

Whether for close-coupled main drive lines or for exposed steering and adjustment drives, designers have learned to rely on **MECHANICS**. Where joints must run all day at high angles—where there are severe shock loads—where wide angles and long slip are common—and where dirt and/or moisture constantly are present—**MECHANICS** Roller Bearing **UNIVERSAL JOINTS** are used. Lubrication is so tightly sealed in that dirt and moisture cannot enter. Our engineers will be glad to show you how **MECHANICS** Roller Bearing **UNIVERSAL JOINTS** will help insure the reliable operation of your product.

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*Roller Bearing*  
**UNIVERSAL JOINTS**  
For Tractors • Trucks and Farm Machines

Export Sales: Borg-Warner International  
36 South Wabash Chicago 3, Illinois

For more facts, use Request Card at page 18 and circle No. 284



**Grading contractor  
on Trans-Canada Highway  
has powerful rigs excavate . . .**

## A million yards from a single cut

Where the Upper Levels Highway in North Vancouver, B. C., drops from its typical mountainside location to meet the approach to the new Second Narrows Bridge, the grading contractor is removing more than a million cubic yards of material from a single cut. A substantial part of the material moves down to form interchange and bridge-approach fills. Here haul-road grades have been as steep as 30 per cent.

The 5,000-foot downhill haul to the bridge approach was not particularly difficult, but getting the scrapers back up the steep grade required a lot of power. The contractor, Jamieson Construction Co., Ltd., Vancouver, assigned three new Euclid TS-24 scrapers to this job, and these rigs used the full horsepower of their twin engines in getting back up the hill as quickly as possible.

Two other spreads worked out of the big cut, and several other spreads were scattered over the 5.75 miles of the job. The \$2,196,681 contract with the British Columbia Department of Highways will extend the Trans-Canada Highway from its present terminus at Taylor Way to the new Second Narrows Bridge.

The new road will have four lanes separated by a 5-foot median in some critical areas and by a wide unpaved median in places where more width is available. In general, the 12-foot roadway lanes are flanked by 10-foot paved outside shoulders.

### Steep haul roads

Of the 1.6 million yards of excavation in the project, more than a million yards came from the one big cut. It is about half a mile long and ranges up to 90 feet in depth. Its maximum width at the top is 550 feet. About 500,000 yards of the material was moved upgrade, and the remainder went down toward the bridge.

At the start, the TS-24 scrapers worked down a 30 per cent grade, but as the brow of the hill was cut down and some fill placed in the steepest areas, the grade was reduced to about 22 per cent. The scrapers, which had 18-inch sideboards, were loaded to heaping with the aid of a Cat D9 pusher. They made good time downhill and dumped on the fly, but it took their full horsepower to get them back up the steep grade.

The D9, equipped with an Ateco ripper, kept the cut scarified between scrapers.

On the fill, Cat D8 and Allis-

A Euclid TS-24 with a load from the million-yard cut on the Upper Levels Highway near Vancouver, B. C., gets a push from a D9 with Ateco ripper as it starts down the steep grade to dump for the fill for the Second Narrows Bridge.



## GET REAL PRODUCTIVE



Ask Nick Pinello what he likes about the "Jimmy" Diesels in his earth-movers and he'll tell you "consistently more 'on-the-job' time." And that's just one reason why he picks GM Diesels when he's picking power.

For he'll also tell you his Tournapulls and "Twin C" pusher have racked up as much as 5,500 hours with "scarcely a day in the shop" and no major overhaul. That record is one reason Nick says this about engine parts,

"We haven't begun to stock them."

And it's a big reason why Pinello Construction is making such good time on the 1,700,000-yard grading job they're handling outside Colorado Springs. With equipment spending more time on the job—less time in the shop—the dirt's bound to move . . . fast.

This Colorado Springs company currently operates two "B" Tournapulls powered by turbocharged 6-110

"Jimmys," three "C" Tournapulls with "6-71's" and the "Twin C" pusher with two "6-71's." They have given up to three years' service.

Get GM Diesels in your shop and you'll have units that spend more time on the job—make more money from the job. Proof? See the Diesel distributor—he's in the Yellow Pages under "Engines." Write and mail the postcard for full details.

# GM DIESEL ALL-PURPOSE

CONTRACTORS AND ENGINEERS





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PL & R,  
Detroit, Mich.



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Dept. CE-1



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CARD TODAY



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GASOLINE  
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Makes it easy to figure the savings you'll make by switching to GM Diesels in trucks, shovels, compressors and other equipment you use.

Please send me my GM Diesel Operating Cost Computer:

NAME \_\_\_\_\_

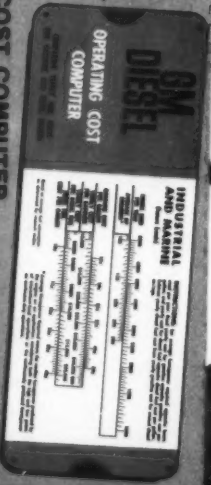
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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

ZONE \_\_\_\_\_

STATE \_\_\_\_\_







Most of the compaction on the big fill leading to the bridge is provided by an 72-inch vibrating roller pulled by a D4. An Allis-Chalmers HD-21 tractor-doxer keeps the fill area level.



A Model C Tournarocker adds its load to the embankment being built up for a bridge overpass at the highway interchange. At right, a Tornadoizer works over the material placed in the fill.

# LET A GM DIESEL ENGINE

Jumped production 25%—  
saves \$25 a week on fuel



a gasoline engine in your excavator? Want to save big money and get production at the same time?

Take a tip from Chehalis, Wash., contractors Beuter & O'Neil who replaced the gasoline engine in their Lorain TL-25 with a 4-53 "Jimmy" Diesel.

They're saving \$5.10 a day in fuel—jumping 25% more work per shift. And more, the "Jimmy" has ended stalling on the job—has "lots of power" according to the operator,

who says he "can't kill it on idle."

And Beuter & O'Neil also say, "We like particularly the fact that the shovel can now pick up heavy stuff at an idle—it doesn't tear the bucket apart. Open throttle with the previous gas engine raised Cain with the machine. Now we can hook out rip-rap at an idle—something we couldn't do with the other engine."

With savings and performance like that, Beuter & O'Neil figure their GM Diesel will pay for itself in less

than a year—a bargain any way you figure it. You may do the same thing if you repower with a "Jimmy." Proof? See your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or mail the postcard for your GM Diesel Operating Cost Computer today.



## GM DIESEL

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 26, MICH.

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario  
Parts and Service Worldwide

# POWER LINE

sets the  
standard of  
Diesel  
productivity

For more facts, use business reply card or circle No. 235

Chalmers HD-21 tractor-doxers shaped the material as an Essick vibratory roller pulled by a D4 compacted the material.

Very large boulders were encountered in this cut, some of them running to 70 or 80 cubic yards. These were drilled with jackhammers and shot. This, and some other rock in the cut, was loaded and hauled by a spread consisting of a Bucyrus-Erie 54-B shovel and four Model C Tournarockers.

#### Other spreads

A third spread working out of the big cut consisted of three Cat DW21's with Cat 470 scrapers, a Euclid TC-12 push-tractor and a Cat D8 ripper-doxer. These two spreads hauled uphill from the cut at the start, but joined the TS-24's on the long downhill haul after the haul-road grade had been reduced.

A spread working at the far west end of the project carried three C Tournapulls, three D8's, a D6, a Gradall, a 38-B shovel and a Lima dragline. In addition to handling the usual grading operations, this spread placed a number of culverts and excavated unsuitable clay subsoil whenever it was encountered.

#### Some utility work

Other equipment handled grading and drainage, as well as a considerable amount of utility work through the middle section of the job. Fine-grading and haul-road maintenance were handled by Caterpillar, Gallon, and Adams motor graders.

Over the finished grading section, the contractor is placing a 6-inch lift of 2-inch screened and crushed gravel subbase, a 6-inch lift of ¾-inch gravel base, and two 1½-inch courses of bituminous surfacing. Although the grading was not yet completed last fall, work was started on the bituminous surfacing. The entire job is scheduled for completion this season.

#### Maintenance

With the equipment spread out over the entire 5.75 miles of the job and working 10-hour days six days a week, the lubrication and maintenance crews operated under some handicaps. This was especially true because deep canyons prevented their





While one of the DW21's unloads, a Cat No. 12 grader and a Tornado dozer shape the embankment. At the start, scrapers had to negotiate a 30 per cent grade from the cut area.



On another part of the cut, a D8 with Cat ripper and angledozer loosens material for the DW21 tractors with Cat 470 scrapers. The contractor kept three spreads of equipment working out of the big cut.



This Mercedes-Benz Unimog, powered by a 30-hp diesel, here pulls a welding generator near the field shop, but it is used to take field mechanics and their equipment over the roughest type of terrain to all parts of the job.



**Bethlehem Rope on West Virginia Highway**—Interstate 77 is an important link now taking shape in West Virginia's growing network of express highways. A north-south, 4-lane route connecting Parkersburg and Charleston, the new road will offer motorists a direct tie-in with the West Virginia Turnpike. This picture was taken recently during rough grading near the site of the Goldtown Interchange, near Sissonville, performed by Harrison Construction Company, Pittsburgh, Pa. Husky Bethlehem Wire Rope in various sizes is used here extensively, not only on drop-ball cranes, but also on draglines and shovels, scrapers, and bulldozers.

Bethlehem Steel Company, Bethlehem, Pa. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem Wire Rope

**BETHLEHEM STEEL**

For more facts, use Request Card at page T8 and circle No. 286



(Continued from preceding page)

traveling the length of the job over the right-of-way, and the detectors were long.

Of a total of 24 workmen on the job maintenance force, seven handled the lubrication and daily servicing. Using two service trucks equipped with Lincoln grease pumps and tools, Essick compressors, and Kato electric generators, these men serviced all of the equipment at the end of the work shift each day.

The service crew also fueled all of the machines each evening, working with a 1,500-gallon fuel truck and two 2,000-gallon stationary tanks. Standard (Chevron) fuels were delivered to the site daily.

The mechanics worked two shifts daily, which gave them the opportunity to do some of the repair work on machines during the down period at night. A small shop setup was established with each of the scattered spreads. Here, a supply of tools and a light plant made it possible for the mechanics to do the smaller jobs in a minimum of time.

The main job shop was set up near the big cut. At this site, a converted bus and a large trailer van carried parts and supplies to take care of almost any field repair. A Mercedes-Benz Unimog 4-wheel-drive vehicle, resembling a Jeep, helped the mechanics get over the rough terrain to any part of the job with portable welding generators or other equipment.

In addition to keeping all of the equipment in good operating condition, Jamieson's crews kept it looking good. All of the machines were painted orange and were washed often enough to keep them looking good. Each machine and piece of equipment was identified by an attractive blue and orange decal supplied in a number of sizes to match everything from the office coffeepot to the big scrapers.

Goodyear tire service was provided by British Columbia Tire, Ltd., from home shops in Vancouver. Although a big tire rig was not on the job at all times, it was available on very short notice.

#### Personnel

The contractor's field office was housed in a special Scotia 10x40-foot

**CONTRACTORS AND ENGINEERS**



... built to order by the West  
... Trailer Mfg. Co., Ltd., Burnaby,  
... In addition to the general office  
... a private office for the job super-  
... this trailer housed a  
... 12-foot first-aid room. This fully  
... emergency room has a spe-  
... wide door to admit stretcher  
... The job timekeeper and office  
... are both qualified in first  
... and one or the other is always  
... on hand.

Although the job is widely spread  
... a mobile radio system maintains  
... communications. Five mobile  
... and a base station at the field  
... all manufactured by Pye Can-  
... Ltd., keep the several spreads in  
... communication with the office and  
... the superintendent.

Jameson's crew of 140 to 150 work-  
... is run by a staff headed by gen-  
... eral superintendent Frank Polley and  
... including superintendents Bob Bag-  
... and Carl Lenihan, and office  
... manager Warren Ruggles. Assistant  
... manager Ralph Ainscough supervised



General superintendent Frank Polley gets around the job in his Jeep.

the job in general and provided liai-  
... son with the main office.

For the Provincial Highway De-  
... partment, J. F. Keenleyside is senior  
... resident engineer on the project. His  
... assistants are resident engineer H. O.  
... Zimmerman, party chief H. N. Nordli,  
... and soils technician R. K. Wiltse. The  
... chief engineer of the British Colum-  
... bia Highway Department is F. T.  
... Brown; the director of construction  
... is R. C. Webster, and the highway  
... construction engineer is J. A. Denni-  
... son. The regional construction engi-  
... neer is E. J. Garrett.

THE END

### Five dredges designed for work in Argentina

Five 12-inch hydraulic dredges, specifically designed for working in canals and other narrow waterways, will be built by Ellicott Machine Corp., Baltimore, for the Ministry of Public Works of the province of Buenos Aires, Argentina.

The dredges, each powered by a 220-hp diesel engine, and capable of digging to a 16-foot depth, will be used in canal and maintenance work in the delta of the Parana River. The work is designed to lessen the possibility of floods and to provide adequate drainage.



PILE DRIVING for two parallel steel and concrete overpasses averages 16 piles per 8-hour day through hard earth and gravel. The structures are for Interstate Route 15 in Montana. The 18-ton Lorain Model 26 is driving 17-foot 12-inch-diameter piles. Later, it will team up with another crane for lifting 62-foot pre-stressed-concrete beams.



## Eimco Crawler-Tractors Give You Today What Others Can Only Promise for Tomorrow

### Power Shift

Eimco's patented, unique "Unidrive" transmission lets you shift from one speed to another, forward or reverse, at any engine or tractor speed or load. Features gears that never reverse rotation! Heavy duty single stage torque converter is standard equipment.

### Independent Track Operation

Eimco's patented Dual Final Drives give you "flip-of-the-lever" control over each individual track for true spin, as well as normal brake, turns.

### Full Track Oscillation

Eimco's patented alloy-steel equalizer bar permits full track oscillation, even with attachments, for greater stability and safety.

### True Cockpit Visibility

Eimco's exclusive up-front operator position means the operator can see his work as he approaches it for greater control, safety and work output with no stretch, squint, squirm . . . less operator fatigue.

### Anti-Friction Bearings

In every track roller and idler . . . each bearing in separate cage to maintain accuracy, longer life, and ease of maintenance.

### Power Take-Off

Standard SAE specifications for take-off and drilling. Shaft runs continuously and is not affected by track operation.

Step Up Your Work and Profit . . . with the modern, efficient

Eimco 103	Eimco 105	Eimco 106
100 HP	143 HP	205 HP

Tractors — Diggers — Excavators — Front End Loaders — Log Loaders — Special Steel Mill Excavators and Front End Loaders

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For more facts, use Request Card at page 18 and circle No. 287





## Big open cuts start

# Earthwork for underground ICBM base

Although it means taking out extra yardage, the contractor for the underground Titan missile base at Lowry Field, Denver, Colo., began as a series of big earthwork operations. It will be concluded in the same way, for much of the excavation is replaced as backfill around the underground structures.

Construction of this country's first operational Titan missile base at Lowry Field, Denver, Colo., began as a series of big earthwork operations. It will be concluded in the same way, for much of the excavation is replaced as backfill around the underground structures.

The contractor for the \$70 million

project chose to use scraper spreads to excavate about half a million cubic yards of earth at each of the six launcher sites. He is sinking the deep shafts for the missile silos and backfilling over and around the completed reinforced-concrete structures.

The constructor of this first underground missile base is a joint venture headed by Morrison-Knudsen Co., Inc., Boise, Idaho, and including Johnson, Drake & Piper, Inc.; Paul Hardeman, Inc.; Olson Construction Co.; and F. E. Young.

The designer of the facility is Daniel, Mann, Johnson, Mendenhall & Associates, Los Angeles. The contract was awarded by the Omaha District of the U. S. Army Corps of Engineers, whose forces are also supervising the construction. The Titan missile is being manufactured by the Martin Co. at a plant in the Denver area.

## Spread over wide area

Two contracts, both taken by the same joint-venture contractors, were awarded for this first Titan base. Each calls for the construction of three launching complexes. The six units are dispersed over a wide area, spanning nearly 50 miles, that is located for the most part in the old Lowry Field bombing range. Individual sites range from 5 to 35 miles apart.

Each complex includes three missile silos, propellant and equipment terminals, powerhouse, control center, and retractable radar antennas, together with connecting tunnels and equipment. The entire complex is underground; only the hatches for the missile silos, the radar antennas, and the personnel entrances are visible at the ground surface. This is the first hard or completely underground ICBM base to be built in the free world.

The layout of each complex occupies a site about 900x1,600 feet, with the three missile silos at one end, the radar antennas at the other end, and the powerhouse and control center between. The latter are dome-roofed structures, but practically all of the others are vertical cylinders or silos.

## Preview of the future?

This first underground missile base may be a preview of the military support of the future. Instead of take-off and landing strips of concrete and asphalt spread across two to four miles of countryside, the future airbase may be just a cluster of holes in the ground. The gatehouse at the entrance may be the only above-ground structure.

Rather than make smaller but more expensive excavations for each

**Biggest development in pumps in a decade?**

# NEW CMC

**WONDER-Lite**  
LINE OF  
LIGHTWEIGHT  
PUMPS

• ALUMINUM PUMP BODY AND ENGINE... today's most portable pumps.

• CAST IRON VOLUTE AND IMPELLER... take roughest, toughest wear.



A whopping 19,000 gallons of water per hour... YET WEIGHS only 97 POUNDS! That's the fantastic 3" Model W19A WONDER-Lite at left.

Here's a new line of lightweight pumps that can knock the socks off the "heavies" in PERFORMANCE... PORTABILITY!

Unique, simplified "aluminum-iron" design of CMC WONDER-Lites makes them extra compact, lightweight... extremely portable... yet plenty rugged for toughest pumping jobs.

Outperform any similar size pumps on the market! Prime automatically... RECORD FAST... even on suction lifts to 25 feet. Just the pumps for contractors, city maintenance departments, telephone companies, etc.

Available 4 models 1½" to 3" sizes with 4-cycle Briggs & Stratton all-aluminum engine.

CONSTRUCTION MACHINERY CO., Waterloo, Iowa

☐ Rush catalog on new CMC WONDER-Lite pump line.

☐ Send name of nearest CMC pump distributor.

NAME

COMPANY

ADDRESS

CITY

STATE

write for NEW FREE  
WONDER-Lite  
CATALOG



CONSTRUCTION MACHINERY CO., WATERLOO, IOWA

• DUAL PRIME PUMPS • DIAPHRAGM PUMPS • HI-PRESSURE & JETTING PUMPS

For more facts, use coupon or Request Card at page 18 and circle No. 288



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ENGINEER

structure, M-K opened the entire area, using scraper spreads to carry the excavation down about 70 feet to the powerhouse and control-center foundation levels. The deeper silo excavations were then carried down from about 40 feet below ground surface.

M-K used one scraper spread of its own and subbed a substantial part of the excavation to Hopkins Construction Co., Denver. The M-K spread included six Cat DW21 scrapers, four D8 tractors, a D9 with Ateco ripper, and a Cat 12 motor grader. Accompanying the spread were a shop trailer carrying a large supply of parts, a diesel generating plant for electricity, a compressor to supply air, and a mobile lubrication rig. This made the spread self-sufficient. Yet all of the equipment was highly mobile and could be moved quickly from one site to another as the work progressed.

Hopkins used two spreads. The larger of these included eleven Euclid 9-18 and TS-24 scrapers, four D8 push-tractors, and two D8 tractor-rippers. The second spread carried five Euclid and International scrapers and three tractors.

The excavations included the space occupied by each of the structures, plus a working area around the structure and the required side slopes. Since the ground stood on a very steep angle, the crews were able to leave stable side slopes ranging from 1 to 1 to about 1/2 to 1.

Although a variety of soils was encountered, they all yielded readily to the rippers and were loaded by the scrapers without difficulty. Most of the hauls are short; they range to only about 1,500 feet, since a substantial part of the material has to be brought back into the holes in the backfilling operation.

There were some scares as dud practice bombs were encountered in the excavation. These had been in the ground since World War II when this area was used as a bombing range. A bomb-demolition crew from Hill Air Force Base spent three weeks helping to clean up the area. They turned up a lot of scrap iron, but nothing really dangerous. No serious accidents occurred because of the bombs.

Since the contractor was anxious to get concrete placement as far along as possible before winter weather, the earthwork operations were really pushed. The scraper spreads, working double shifts, completed the half-million yards of excavation at each site in about two months. This required a lot of equipment to work very restricted areas, and this, in turn, demanded extremely careful planning and supervision to avoid wasteful delays.

As soon as the scrapers had the missile-alo areas down to grade, the mining crews moved in to start sink-

(Continued on next page)

For more facts, circle No. 289-



Early in the job, this Ingersoll-Rand 900-cfm compressor and Cat D8800 generator set supply temporary air and power to a site until power lines can be strung.

The only  
truck  
mixer  
with  
Torsion Bar  
Design  
is  
**THE NEW SMITH**

this is the  
torsion  
bar

... and it permanently joins the rear frame and front pedestal so that drum, rollers, and drive all move as one sturdy unit. It's not just a sway-brace... not a flimsy stay that expects the water tank to provide support for a drum full of concrete... but a tough steel bar that provides an ultra-solid base for the mixer. As a result, this design actually strengthens the truck frame, preventing distortion while in transit and practically eliminating any wear on the drive components from misalignment. And the torsion bar is only one of many outstanding features on all Smith Truck Mixers! Ask your Smith Distributor to show you all of them in a demonstration. THE T. L. SMITH COMPANY, Milwaukee 1, Wisconsin and Lufkin, Texas. Affiliated with Easick Manufacturing Company, Los Angeles, Calif.





This Conveyco 150-ton plant supplies concrete for the four sites on the range; two other sites are served by individual plants. A Fruehauf trailer unit is delivering cement.

(Continued from preceding page)

ing the deep shafts. These shafts were carried down 165 feet below normal ground, or nearly 130 feet below the floor of the initial excavation. The shafts were excavated to a diameter of 45 feet to provide a finished inside diameter of 40 feet with concrete walls 2.5 feet thick.

A team of two machines handled

most of the excavation for a shaft. A tractor equipped with a rear-mounted ripper and front dozer or bucket worked in the hole, loosening the material and bringing it over to one side of the shaft. A Bucyrus-Erie 54-B with Owen 2-yard clamshell raised the loose material from the shaft in a clamshell bucket. Four of these teams are handling the excavation of the 12 deep shafts at the six sites.

In addition to the excavating team for a shaft, another crew is used to set the steel ring beams and gunite the sides of the excavation to prevent weathering and sloughing of the shale walls. This crew has a 30 or 35-

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on truck crane, gunite mixer and  
pinner, air compressor, and neces-  
sary accompanying machines.

A carefully planned schedule keeps  
all of the rigs busy and prevents them  
from getting in each other's way. In  
the usual sequence, the tractor and  
clam excavate enough for the place-  
ment of two rings of steel. Some  
limited work with air spades is neces-  
sary to trim the shaft to exact con-  
tour, but this is carried on while  
the tractor is at work.

As soon as the tractor is out of the  
shaft, the lining crew moves in and  
sets the two rings of steel H-beam  
supports. These rings are made up

of 6-inch WF beams, with six seg-  
ments completing the circle. The  
rings are usually set at 5-foot centers  
near the top and spaced to 2½-foot  
centers for about the last 90 feet.

The crew then strings 2-inch-  
square No. 12 (2:2:12:12) welded-  
wire fabric over the exposed area of  
shale between the rings. This serves  
as reinforcement for the 2-inch ap-  
plication of gunite. By the time this  
crew has extended the access ladders  
and completed other incidental work,  
the excavating team is ready to move  
back in for another lift.

Workmen in the shaft are protected  
from spillage from the clam bucket

by a steel and timber barrier that  
divides the shaft into two work areas.  
The barrier consists of vertical planks  
attached to steel beams that are  
fastened to each of the support rings.  
The barrier hangs like a huge wooden  
curtain from the top of the shaft al-  
most to the bottom. It cuts off a small  
area of the circular shaft in which  
the clam works. The rest of the area  
is open for the tractor.

As the tractor works around the  
circle, it pushes the loose material  
into the clamming area. The crane  
operator lowers the bucket and picks  
up his loads under telephoned in-  
structions from a guide man in the

hole. All of the cranes are equipped  
with power down for smooth, safe,  
and positive operation in the re-  
stricted conditions. The spoil material  
is trucked from excavations to waste  
piles by dump trucks loaded by a  
crane or by a tractor shovel.

#### Bring power to sites

Getting this huge job done in the  
required 710 days is one of the con-  
tractor's biggest problems. In most  
cases, the contractor pulled a trailer  
field office to the site and started  
excavation as soon as stakes could  
be set.

Electric power was needed early  
at the widely scattered sites, and  
while crews were building some 16  
miles of 13.8-kv transmission line,  
Cat D8800 diesel generator sets were  
brought to each complex to provide  
temporary power. Portable Ingersoll-  
Rand 900-cfm compressors were also  
rushed in to provide air for hand  
spades and gunite machines, and for  
other uses. Later, these were replaced  
with electric-powered compressors.

#### Central plant batches concrete

Concrete for the structures is  
batched from a 150-ton Conveyco  
automatic batch plant set up at a  
central location for the four sites  
on the range. The two off-site ranges  
are served by individual plants of 50-  
yard capacity. M-K hauls bulk ce-  
ment from the Ideal plant at Boet-  
tcher, Colo., in its own Fruehauf  
trailer transports. Aggregates come by  
rail from Boulder to a siding at Wat-  
kins and are trucked to the plant by  
a subcontractor.

Batches are delivered as needed to  
34-E pavers at each of the sites,  
where the mix is placed by the truck  
cranes using 1 or 1½-yard buckets.

Most of the forming is of a con-  
ventional nature. Wood forms for all  
of the sections are prefabricated at a  
central yard located at Buckley Field  
in Aurora, where project headquar-  
ters are maintained. Some of the  
forms, especially for the heavy dome  
roofs, are rather intricate in de-  
sign and fabrication.

(Continued on next page)

## GET POSITIVE PENETRATION AT CUTTING EDGE

The new, all-hydraulic TS-360 is the only motor  
scraper in the 30-yd class with double-acting bowl  
jacks that provide 2-way power for faster loading,  
more cutting control.

The TS-360's exclusive hydraulic down pressure penetrates  
quickly into the toughest-loading materials. Penetrating  
force like this—along with Allis-Chalmers original low, wide  
bowl—gives you fast, heaped loads every pass.

Slope-cutting is another good example! "Cornering-in"  
with bowl down pressure lets your operator sink his bit  
when and where he wants . . . lets him maintain the best cut-  
ting depth while loading. The result: Clean, accurate slopes.

Positive penetration is only one reason you'll get top per-  
formance on any size job. Two-stage steering—forced ejection  
and highest apron lift—90° steer and KON-TORK differential  
are earth-moving advantages you cannot afford to overlook.

Put this new 340-hp TS-360 to work for you. Move more  
dirt per dollar invested than ever before. Allis-Chalmers,  
Construction Machinery Division, Milwaukee 1, Wisconsin.



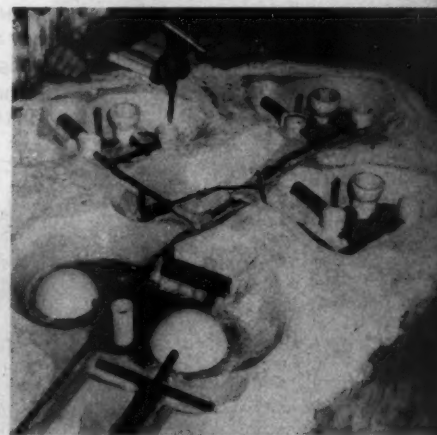
KON-TORK is an Allis-Chalmers trademark.

move ahead with

**ALLIS-CHALMERS**



... power for a growing world



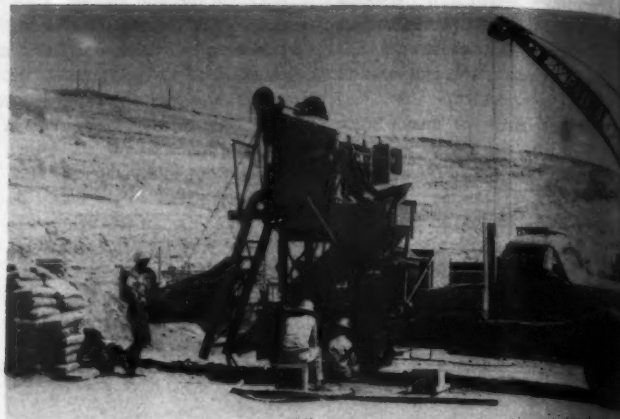
This accurately scaled model of a  
launching complex, built by the  
contractor to work out construction sched-  
ules and excavation routines, was used  
extensively in planning and carrying  
out the early stages of the work. The  
three silos with propellant and equip-  
ment terminals and connecting tunnels  
are at the top. The dome-roofed build-  
ings are the powerhouse and control  
center.

—For more facts, circle No. 290





Shaft excavation for one of the missile silos is done by an Allis-Chalmers HD-6 Tractoshovel with ripper and a Bucyrus-Erie 54-B with Owen clamshell. The tractor pushes loose material to one side where it can be clammed out. The first ring of wales has been set, and walls have been gunited to hold them in place.



A complete gunite setup is mounted on an International truck for mobility. While excavation is being carried on for a silo, the rig moves on to another location where it is needed.

## CALWELD digs a big hole!

*-big enough to shotgun launch any of today's largest missiles!*

A CALWELD BORES A HOLE AS BIG AS 10' IN DIAMETER AND 200' DEEP! DIGS 45' DEEP IN ONE HOUR... BUCKET DRILL HANDLES 14 YDS. PER PASS.

HOLE 10' DIAMETER 200' DEEP

TITAN 90'x10'

ATLAS 80'x10'

THOR 62'x8'

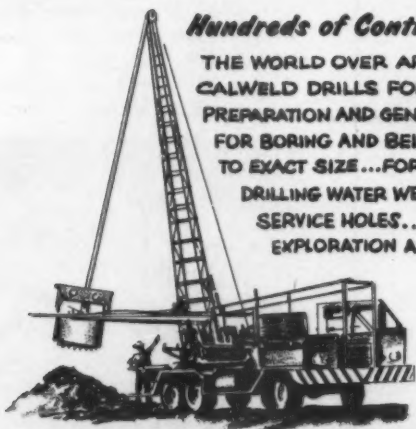
POLARIS BOMARC 47'x4'

TALOS 26'x2 1/2'



### Hundreds of Contractors

THE WORLD OVER ARE USING CALWELD DRILLS FOR FOUNDATION PREPARATION AND GENERAL EXCAVATING... FOR BORING AND BELLING CAISSONS TO EXACT SIZE...FOR DIGGING MANHOLES... DRILLING WATER WELLS AND OIL WELL SERVICE HOLES...FOR DRILLING EXPLORATION AND TEST HOLES.



**Calweld is BIG and does a big job!**

DON'T CONFUSE A CALWELD WITH SMALL AUGER-TYPE POSTHOLE DIGGERS. BUCKET DRILLS AND TOOLS ARE INTER-CHANGEABLE TO DRILL INTO ALL TYPES OF SUBSOIL FORMATIONS INCLUDING ROCK.



## Calweld Drills

CALWELD, INC. 7222 E. SLAUSON AVE., LOS ANGELES 22, CALIFORNIA

For more facts, use Request Card at page 18 and circle No. 391

(Continued from preceding page)

The reasonably large number of similar structures in the two contracts would seem to indicate a possible economy in the use of forms. However, two factors make this impractical.

The first was the lack of time for the design and fabrication of the forms; this would have undoubtedly delayed the start of concrete placement. Secondly, the demand for the greatest possible construction speed required simultaneous placement of concrete at as many points as possible. This greatly reduced the possible re-uses of any form.

### Mechanical installations

The concrete structures are only a minor part of a missile launching complex when weighed against the mechanical, electrical, and other technical facilities required. Much of this equipment was being fabricated or purchased and assembled at off-site locations while the excavation and concrete construction were under way.



As soon as possible after the shaft walls of a shaft are exposed, they are sealed with a 2-inch layer of gunite over welded-wire reinforcing to prevent the shale from softening and sloughing. A gunite machine works on the platform; the mixer is spotted just above the excavation.

CONTRACTORS AND ENGINEERS



EXTRA RUGGEDNESS...

FOR MARION 151-M SHOVEL

WITH WICHITA CLUTCH FOR CROWD

**Wichita Clutch protects gears and shafting under heavy duty digging conditions for this popular Marion Electric Shovel**

To help provide profitable yardage in continuous heavy duty service in mining, quarrying and slag handling, Marion has standardized upon dependable Wichita Air-Tube Clutches.

Main advantage here in *controlled slipping torque* easily adjusted by a hand valve convenient to operator. Clutch is ideal *safety device* for protection of gears and shafting during the high

impact loads created by hard digging.

Typical of Wichita acceptance by Marion customers is the order from one mining company for nine Wichita Clutches for older machines in their mines.

For any tough clutching or braking problem consult Wichita engineers . . . experienced in the most difficult applications in every industrial application.

**Contact your nearest Wichita Engineer.**

Clutch & Control Engineering Co., Livonia, Mich.  
L. H. Fremont, Cincinnati, Ohio  
W. G. Kerr Company, Pittsburgh, Pa.  
Smith-Kaser & Co., Avon, Conn.,  
Philadelphia 44, Pa., and New York, N. Y.  
Frank W. Yarline Co., Chicago, Illinois  
Larry W. McDowell, Long Beach, California  
Andrew T. Lobel, Denver, Colorado  
Robert R. King Co., Cleveland, Ohio  
Norman Williams, Houston, Texas

Allied Transmission Equipment Co.,  
Kansas City 8, Missouri  
Donald E. Harman, Dallas, Texas  
C. Arthur Weaver, Richmond, Virginia  
Malcolm S. Cone, Memphis, Tennessee  
Dominion Power Press Equipment, Ltd.,  
Burlington, Ontario, Canada  
R. E. Kunz, Seattle 4, Wash.  
Norman Rupp Co., Portland 4, Ore.  
Bates Sales Co., St. Louis 1, Mo.



For more facts, use Request Card at page 18 and circle No. 292



# ★ ★ "SHARP TOOLS!!" ★ ★

★ ★ ★ FOR 1893 ★



BETTMANN ARCHIVES

They had plenty of ingenuity in the old days—what they lacked was sharp production tools! This 1893 Locomotive Ballast Crushing Machine could run at 30 miles per hour, and change to a stone breaker in 5 seconds by raising the drive wheels off the track. The two hand-fed crushers could turn out a total of 25 to 30 yards per hour.

# Today....

Cedarapids  
BUILT BY IOWA





the old  
p pro-  
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stone  
e drive  
nd-fed  
5 to 30

Cedarapids

Built in  
IOWA

Cedarapids gives you the

## SHARPEST PRODUCTION TOOLS

to meet the toughest specifications at lowest cost per ton!

Gone are the days when road rock was merely broken into any old size, and often laid by the farmer to work out his road taxes.

Today, aggregate production is a fine art—roadbuilding is a precise science. To remain competitive you need the most sharply modern equipment design and engineering available. You need the sharp production tools Cedarapids gives you.

Stop a moment and think what it takes to make money in your aggregate producing business today. It takes crushers, screens, feeders, conveyors, washing equipment geared to enormous output—300, 500, 800, 1000 tons or more per hour.

It takes production units that will *meet the toughest specifications in roadbuilding history*. It takes portable plants, like the Commander above, to let you bid on the best jobs that may be hundreds of miles apart, and get you there fast—or stationary plants like the one at the left which are factory engineered by experts to handle your specific local job most productively. And to make money for you, this equipment *must produce at lowest cost per ton*.

Cedarapids equipment does! It gives you the capacity, the specification-meeting ability, and the operating economy you need to meet today's roadbuilding challenge with profit.

**IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa**

INS-15N

Printed in U.S.A.





## IF THE WIRE ROPE YOU'RE USING HASN'T GOT IT HERE...IT HASN'T GOT IT



This rope has it—and has it at every critical point of wear for these reasons:

**Extra Resistance to Bending Fatigue • Extra High Strength**

**Good Flexibility and Excellent Resistance to • Shock • Abrasion • Impact • Crushing**

For anything you want to know about Roebling Royal Blue Wire Rope, ask your Distributor or Roebling's Wire Rope Division, Trenton 2, N. J.

**ROEBLING** 

Branch Offices in Principal Cities John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

For more facts, use Request Card at page 18 and circle No. 294

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A 7-wheel pneumatic-tire roller helps build access roads throughout the site to speed the movement of equipment and materials. The six complexes are spread as much as 35 miles apart.

Most of the concrete construction must be completed by this spring to allow time for the installation of equipment. Then the crews must return to finish this work by the final completion date in the spring of 1961.

The mechanical and electrical installations made under the general contract include such items as the power plant, ventilating equipment, propellant storage and handling facilities, elevators, etc., plus miles of piping and wiring. In addition, the technical equipment for the actual firing and control of the missiles will be installed by the Ballistic Missile Division of the Air Force.

#### Personnel

Master-minding the widespread operations for M-K and its associates is project manager L. Neal Spencer. On his staff are general superintendent Mike Krampotic, project engineer Jerry Gibson, equipment superintendent John Deagan, carpenter superintendent Leon Arnold, shaft superintendent H. F. Pearce, and site superintendents Gunnar Nygard, Pete Boall, Roger Bryer, Calvin Bartholomew, Ray Helmick, and P. A. Corkins.

The Corps of Engineers has set up an area office at Buckley Field to handle the project. The area staff is headed by Lt. Col. Paavo D. Carlson, area engineer, and includes assistant area engineer W. J. Brummette, chief of construction Earl Fiala, assistant chief Hening Nelson, and project engineers Earl Whitmore, Frank Bucholz, John Lea, Paul F. Jensen, John Dickson, and E. J. "Pat" Draper. The district engineer of the Omaha District is Col. David G. Hammond.

THE END

#### Parker-Hannifin news

Thomas F. O'Rourke has been appointed a district manager of distributor sales for Parker-Hannifin Corp., Cleveland. He will cover Michigan, outside of metropolitan Detroit. O'Rourke will handle Crown air-pressure regulators, air filters, and lubricators made by the corporation's Hannifin Co. division; industrial tube and hose fittings made by the Parker Fittings & Hose Division; and hydraulic accumulators, check valves, and lever control valves made by the Parker Hydraulics Division.

For more facts, circle No. 295-

#### Gas-shielded-arc welding book issued by AWS

The group of welding processes that originally went under the name of inert-gas processes is described in a new book on gas-shielded-arc welding processes put out by the American Welding Society. The development of shielding gases that are not inert caused the change of name for the processes.

Contents of the book are taken from published and unpublished material prepared for Sections I, II, and III of the fourth edition of the Welding Handbook. Among subjects taken

up in the book are gas-shielded tungsten-arc welding, gas-shielded metal-arc welding, cutting, gases, equipment and cost data.

There are 30 illustrations and 9 tables in the 78-page book, which is intended as a guide to users of the processes. Photographs and schematic diagram show steps in the work.

Copies of "Gas Shielded-Arc Welding" may be obtained from the American Welding Society, 33 W. 39th St., New York 18, N. Y. The book is priced at \$1.50.

## Depend on EUCLID'S GREATER DIMENSION for lower hauling costs

greater range of types and capacities  
greater background of experience  
greater return on investment



Model R-27 has rated payload of 54,000 lbs. and a heaped capacity of 26½ yds. . . available with Cummins 335 h.p. and GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph.

Backed by better than 25 years of specialized experience in building off-highway earthmoving equipment exclusively, Euclid's modern rear-dump line incorporates advanced engineering that is a result of unmatched field experience. From the 10-ton Model R-10 to the big 55-ton "Euc" with two engines and a total of 672 h.p., Euclid Rear-Dumps meet today's requirements for big performance.

This greater dimension . . . in a wide range of capacities, in choice of engines, transmissions, tire sizes, and in type of hauler . . . in the parts and service facilities of Euclid's world-wide dealer organization, too . . . can mean lower hauling costs on all kinds of earthmoving jobs.

**EUCLID** Division of General Motors, Cleveland 17, Ohio  
Euclid (Great Britain) Ltd., Lancashire, Scotland

A complete line of rear-dumps with payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons . . . also semi-trailer models of 12, 22, 35 and 50-ton capacity.



# EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE





Winner of ASCE's award for the outstanding civil engineering achievement of 1960 is the St. Lawrence Project, involving the power and seaway developments on both the U. S. and Canadian sides of the river. Lower left is the Iroquois Lock, Canada; center, Moses-Saunders Power Dam connecting the two countries; and upper right, Eisenhower Lock.

### St. Lawrence Project wins ASCE award

■ The St. Lawrence Project, including both the power and seaway developments on the U. S. and Canadian sides of the river, has been judged the outstanding civil engineering achievement of the year by the American Society of Civil Engineers at its convention held last month. This is the first award made by the society to recognize an achievement in civil engineering. Hereafter, an award will be made annually for the

outstanding civil engineering achievement in the nation.

Actually, the citation is directed toward the power and seaway projects themselves. These are owned by the Power Authority of the State of New York, the St. Lawrence Seaway Development Corp. (USA), the Hydro-Electric Power Commission of Ontario, and the St. Lawrence Seaway Authority (Canada). Each of these entities will receive a plaque from ASCE on May 19 at Massena, N. Y. Representatives from Canada and the United States will participate in the ceremonies, which will be held on the power dam which connects the two countries.

Nominations, made by the directors of the society in their respective districts throughout the country, were judged in three categories: whether the project demonstrated improved skill in civil engineering; whether the project contributed to engineering progress; and the project's value to mankind. A jury of engineering magazine editors selected the St. Lawrence project for the 1960 award, and it was officially confirmed by the society's Board of Directors.

### Barnes names manager in new marketing setup

■ Norman W. Eckhardt has been named to the newly created position of marketing manager by Barnes Mfg. Co., Mansfield, Ohio. He will have full responsibility for sales administration, planning, and execution in four general marketing areas including standard market sales, special market sales, contract sales, and advertising and sales promotion.

Promoted to four key sales and advertising posts in the new setup are J. H. Hulse, Jr., manager of water-system sales; W. D. Schneider, manager of pump sales; S. J. Keiser, manager of contract sales; and P. E. Finical, manager of advertising and sales promotion.

### Koehring Division names

■ Paul A. McDonald has been appointed western district manager for the Koehring Division, Koehring Co., Milwaukee. He will cover California, Utah, Nevada, and Arizona from Danville, Calif., headquarters.

### Insley opens office

■ Insley Mfg. Corp., Indianapolis, has opened a western regional office at 2821 W. Mission Road, Alhambra, Calif. The office will provide sales, service, and parts for Washington, Idaho, Montana, Oregon, Utah, California, New Mexico, Arizona, Colorado, Nevada, Wyoming, Alaska, Hawaii, and British Columbia. Vice president J. Ray Elliott is manager.

CONTRACTORS AND ENGINEERS



## LIMA ROADPACKER MODEL D

Compacts Fast, Wide and Deep on Macadam, Gravel, Crushed Rock, Sand, Soil Cement and Stabilized Bases

SAVE WITH SINGLE COURSE CONSTRUCTION

Lima Roadpackers meet the challenge—no other vibratory compactor gives you so many cost-saving job-speeding features . . . the reason why Lima Roadpackers are preferred by contractors throughout the world for fast production on highway and airport construction jobs.

Compare these profit-making features!

#### Heavy Vibrators

Six 437 pound vibrators deliver earth-shaking vibrations for deep, uniform densities. Vibrator units are completely sealed—no external moving parts. Vibrators are self-lubricated and need no daily maintenance. Required densities are quickly achieved. Macadam rock is tightly keyed, with screenings vibrated into voids in only three applications on most jobs. Compacts up to 600 tons per hour.

#### Infinite Speeds

20 feet per minute to 30 miles per

hour! A fluid motor propels the machine while compacting. A dial selector gives compaction speeds to match any job including new high production requirements within a broad range of 20 to 95 feet per minute. Roadpacker can be anywhere on the job at a moment's notice. Heavy duty transmission provides fast highway travel speeds to next job.

#### One Lever Instant Reversing

Compacts forward or reverse with one lever control—no gear shifts—no de-clutching—no stopping. With the Lima Roadpacker you have no lost time and no depression in the material being compacted when machine is reversed.

#### Variable Working Widths

End shoes fold back for a selection of 4, 5 or 6 shoe working widths. Easily folded by the operator alone, the Roadpacker carries unused shoes ready for wider working widths at any

time. Folded end shoes permit Roadpacker to travel over highway.

#### Controls Up Front

Roadpacker controls are all grouped at operator's seat—engine gauges and controls are mounted on dash panel. Foot accelerator in addition to hand throttle provides natural roading of Roadpacker.

#### Widener Attachment

Extension arm works shoes in a widening trench to 11" below the existing pavement. Quickly adapted to various width widening work; replaces trench rollers.

These are only a few of the advantages incorporated into the new rugged Lima Roadpacker, Model D. For complete information, see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

#### LIMA

Shovels—to 6-cu. yd.  
Cranes—to 110-tons  
Draglines—variable

#### LIMA SUPER ROADPACKER

For the large construction jobs such as superhighways, air bases and earth-fill dams, Lima offers the Super Roadpacker with two rows of six hydraulically controlled vibratory shoes. Compacting widths up to 15 feet.

#### LIMA AUSTIN-WESTERN

Crushing, Screening and Washing Equipment

**LIMA** Construction Equipment Division, Lima, Ohio  
**BALDWIN · LIMA · HAMILTON**

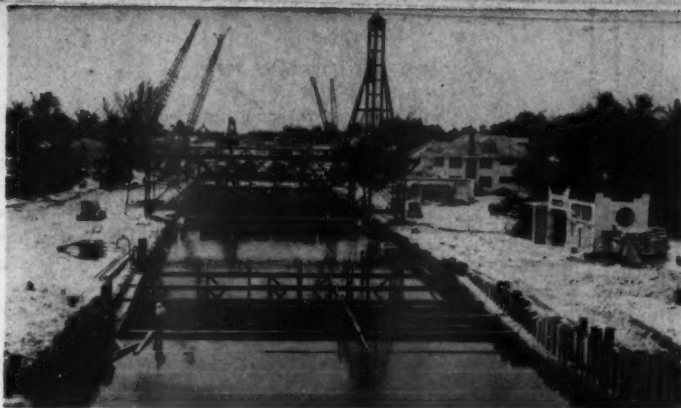
Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

For more facts, use Request Card at page 18 and circle No. 296





Costly excavation and a thick concrete tremie seal were unnecessary for a tunnel under New River in Fort Lauderdale. The rig on the first traveling bridge (background) drives casing for tremie anchor bars; a device on the second tests strength of the bars in the 4-foot seal.



## Grouted anchor rods hold thin tremie seal for open-cut tunnel

A radical system of anchoring a tremie seal has saved Thorington Construction Co., Richmond, Va., a substantial chunk of time and money on a big cut-and-cover vehicular tunnel under Florida's New River in Ft. Lauderdale. The contractor held down a veneer-thin 4-foot seal with anchor bars grouted into layers of sand and lime rock. This eliminated the need for a 28-foot-thick gravity-type tremie seal and costly excavation.

A Manitowoc crane with McKiernan-Terry 9-B-3 hammer, mounted on a traveling bridge that spanned the sheet-pile cofferdam, drove 7-inch-diameter pipe casings into the lime rock. The casing's tip was closed with an expendable driving cap. After each casing was driven, crews pumped in grout, inserted a No. 11 reinforcing bar, retracted the casing, and moved to a new location to repeat the procedure.

After a suitable curing period, all of the more than 2,500 anchor rods were tested with a measured pulling force exerted by a winch mounted on a second traveling bridge. Rods were from 20 to 72 feet long and were fitted with fishtail holding plates on top to increase anchorage strength in the tremie seal.

### Complex project

River traffic creates job problems. The contractor must keep open a 40-foot-wide navigation channel; this determined the 2-stage method of construction. In the first stage, the contractor will build the south section of the tunnel to mid-channel.

(Continued on next page)



Morris & Reimann Wreckers:

## Well pleased with LIMA 44-T

"We've been in the wrecking business 28 years and our 2 year old Lima 44-T is perhaps the best mobile crane we've ever owned!" That's what wreckers Orville Morris and Nelson Reimann, Amherst, N. Y., have to say about their truck-mounted 30-ton Lima crane.

### Travels city streets

"It's a fast and powerful rig. We once dismantled a 140-ft. stack in only 45 minutes with a wrecking ball attached to the Lima. It's a good traveler, too. Moves about on city streets from job to job with speed and ease.

"Lima's many special features result in important dollar savings. Maintenance costs and downtime have been very low... distributor service excellent.

"We're very well pleased with our truck-mounted Lima."

### Undivided responsibility

The 44-T is a versatile 30-ton crane or a 1-yd. shovel. It can also be used with interchangeable dragline or clam-shell attachments. The heavy duty 10-wheel carrier (6 x 4 or 6 x 6) is designed and built by Lima... giving you the benefit of the undivided responsibility of only one manufacturer. Two engines; choice of power.

Lima Truck-Mounted Cranes are available in capacities up to 75 tons, shovels to 1 1/4 yd. There's a Lima type and size to add profit on your job. Get all the facts. See your nearby LIMA distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.



Workmen in personnel cage suspended from jib of 130-ft. boom rig line around Jamestown, N. Y., church steeple in preparation for demolition. Crane is a Lima 44-T.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

**LIMA** Construction Equipment Division, Lima, Ohio  
**BALDWIN · LIMA · HAMILTON**

Shovels • Cranes • Draglines • Pulshovels • Roadpackers • Crushing, Screening and Washing Equipment

For more facts, use Request Card at page 18 and circle No. 297



MZ-38 sheet piling, supplied by L. B. Foster Co., is interlocked with an adjacent sheet by a Manitowoc 3900 crane with 130-foot boom. A steel-frame template guides the setting of the piles. Guide beams at the top of and bottom of the template can be adjusted to align the panel of piles.

APRIL, 1960



(Continued from preceding page)

and a sheet-pile bulkhead will seal it off. Then the river will be diverted over the completed tube and work will begin on the north cofferdam. This, too, is a 2-stage operation, so that traffic will not be interrupted on Los Olas Boulevard.

The tube measures 850 feet from portal to portal and will have two 24-foot-wide roadways, with 14-foot headroom, and a 4-foot 9-inch sidewalk. The ramps at either end dip down to the tunnel at a 5½ per cent grade. From end to end, the contract section stretches not quite half a mile. Total cost is almost \$6½ million.

As soon as the south approach area had been cleared, pile driving began. Thorington rented all required MZ-38

or equal interlocking sheet piling from the New York City office of L. B. Foster Co. Piling in the south cofferdam will be re-used on the north side of the river. The sheet piles range in length from 20 feet at the top of the ramp to 71 feet at the river level.

An easily adjusted template, which saved pile-setting time, is a 2-story-high welded assembly of steel beams cross-braced with angle iron. The crane spots the template on the cleared area. Guide beams, one near the top and another near the ground, slide out readily, and men butt one end of each guide beam against the sheet pile already driven at the corner of the cofferdam. Sighting along

The air lift, powered by Ingersoll-Rand compressors, excavates the cofferdam, while on the rolling bridge a MacIntosh towac crane with McKiernan-Terry 9-B-3 hammer drives casing. After each casing was driven, crews pumped grout, inserted an anchor rod, retracted the casing, and moved to a new location to repeat the procedure.



California paving contractor says:

**Liked A-W roller so well,  
bought two more!**

"Our first A-W performed so well that we bought two more over a period of 5 years. We use them to roll both subgrade and finish courses. They are fast and efficient machines; and can deliver the 95% relative compaction required. Torque converter allows more positive control of rollers for uniform compaction. Hydraulic controls make them easy to operate. Plenty of visibility for operators to do precision jobs. The A-W rollers are well-built; maintenance has been no problem."—Pat Regan, Exec. Vice Pres., A. J. Ralsch Paving Co., San Jose, Calif.

A-W 3-wheel rollers available in 8 to 11, 10 to 12, 12 to 14-ton models; tan-

dem 5 to 8, 8 to 12, 10 to 14 tons. Portable tandem variable between 3½ to 6 tons. Vibratory Roller Compactor and Widener Attachment also available. Choice of gasoline or diesel power; torque converter with 4-speed transmission optional.

Austin-Western offers you a number of important dollar-saving features not available on many other makes of rollers. Let us prove to you the ways in which A-W rollers can increase your compaction efficiency and decrease maintenance and operating costs. Contact your nearby Austin-Western distributor or write directly to us.

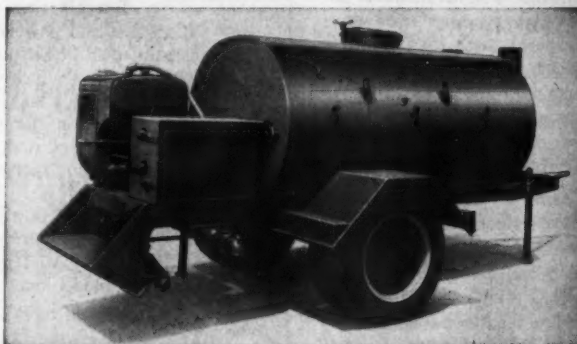
**Austin-Western**

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.  
**BALDWIN · LIMA · HAMILTON**

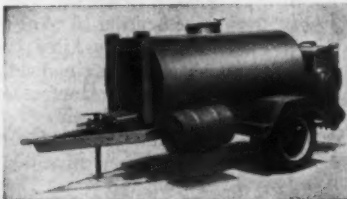
Power graders • Motor sweepers • Road rollers • Hydraulic cranes  
For more facts, use Request Card at page 18 and circle No. 298



## STANDARD STEEL "S-J" Maintenance Distributor



for **VERSATILITY — EFFICIENCY — ECONOMY**



**HANDLES ASPHALT OR  
TAR—FOR PATCHING—  
SEALING—RESURFAC-  
ING—CRACK FILLING—  
OR SURFACING DIRT  
OR GRAVEL ROADS**

### WORKS FAST—FAR AHEAD OF THE GRAVEL GANG

Standard Steel S-J Maintenance Distributor, designed specifically for jobs where the use of bigger equipment is costly and impractical, can be moved rapidly from one location to another for patching, shoulder repair or construction of secondary roads . . . It is equipped with suck back spray bar which permits closing of the discharge valve and pulling back all surplus material in the spray bar and piping for quick cleaning . . . All piping and valves are flanged to permit easy repair or replacement . . . The draw off valve is on curb side for safety . . . and coilless self-generating burners are standard equipment as well as a Viking special asphalt pump which can be completely drained, eliminating the necessity for thawing when the unit is started cold. Write for complete details on Model S-J.

**OTHER PRODUCTS OF STANDARD STEEL**  
ASPHALT DISTRIBUTORS . . . BURNERS . . . POWER AND TRAC-  
TION DRIVEN CONSTRUCTION BROOMS . . . MAINTENANCE  
DISTRIBUTORS . . . TAR SETTLERS . . . AGGREGATE SPREADERS  
STREET FLUSHERS . . . PIPE LINE EQUIPMENT . . . SUPPLY TANKS  
SHELVEING HARDWARE . . . AND AGRICULTURAL EQUIPMENT



Standard Steel Works, Inc., NORTH KANSAS CITY, MO.

For more facts, use Request Card at page 18 and circle No. 299

CONTRACTORS AND ENGINEERS



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APRIL, 19



the line, they set each guide beam right on the money. Steel pins lock them securely in place.

Three Manitowoc cranes handle the pile driving. The first sets the piling, sliding each sheet into place against the template's guide beams. The other cranes, each with an air-powered McKiernan-Terry 10-B-3 hammer, follow up. The team finished the first-stage wall, about 1,800 feet around the perimeter, in 90 days.

The south cofferdam section was split in two by driving a sheet-pile diaphragm across the cofferdam. In that way, building could begin in the upper section while crews simultaneously dug and dewatered the rest of the cofferdam.

#### Air-lifted rock

Excavation in the south cofferdam was slow. Draglines pulled out the bulk of the 80,000 cubic yards of rock and sand.

Later, an extensive bracing system was used. It consisted of steel cross beams, set on 15-foot centers, framed into wales bolted to the side walls. The deeper section of the cofferdam required a double tier of braces. Once the braces went in, excavation became easier. The cranes switched to clamshell buckets to get between braces and close to walls. Controlled blasting loosened lenses of tough

coral for easier removal.

To facilitate rock and silt cleanup, the contractor built air lifts out of 7, 8, and 14-inch-diameter pipe. A crane picks up the air lift by built-in lifting eyes. The crane operator feels his way along, and when he is on bottom, a bank of Ingersoll-Rand compressors delivers air to the base of the lift, sending water, rock, and sand up through the pipe and over the cofferdam wall. All the while, survey crews take soundings to control the depth of cut within close limits.

Work on the north cofferdam will be simpler. Thorington has done away with most internal bracing by grouting tie-back rods into the rock and sand behind the sheet-pile wall. Set at a 1 to 1 slope, the tie-backs bolt into a wale near the top of the sheeting. The rods are 60 feet long and 3 feet apart. Some bracing is necessary to protect stores at the brink of the cut. Otherwise, the top of the cofferdam will be wide open.

#### Personnel

Thorington Construction Co. has James E. Hood as project manager; George Poland, project engineer; and Harold Guppy, superintendent. The engineers are Singstad & Baille, New York City. The owner is the Florida State Road Department. THE END



AN EARTHMOVING TEAM, an International Model 75 Pay-scraper push-loaded by an International TD-24 crawler, clears the way for construction of two warehouses, measuring 183 X 212 feet, in Minneapolis. Carl Bolander & Sons Co., Minneapolis, holds the excavation, pile-driving, and fill-hauling contract.



A-W grader builds service road over desert sand for highway project earth movers.

## Austin-Western works where other graders can't!

Only Austin-Western Super Series graders have 6-wheel drive and 6-wheel steering. These two features permit an A-W grader to work with heavy loads where other makes can't even operate!

#### A-W walks right in

Silva & Hill Construction Co., South San Gabriel, Calif., report, "On a recent job along the Santa Ana River, we had to grade heavy sand. Our Austin-Western Super 200 walked right through the sand with a heavy load on the blade. It had plenty of traction. All-wheel drive made the difference."

"Hydraulic control is another good feature. It allows the operator to instantly switch from back sloping to fine grading with the flick of a lever."

#### Rear steers too

It's virtually impossible to get an A-W stuck—in sand, snow, mud or ice. With power up front and the ability to steer the rear too, an operator can carry a full load on his blade without sidetrust while he works forward in a straight line.

The many operational advantages of Austin-Westerns help spell out a story of increased job profits through dependable, efficient operation with low maintenance costs. A-W graders are available in 6-wheel Super models or 4-wheel Pacers in a wide range of weight classes, from 16,000 to 30,000 pounds, and power ranges, from 106 to 143 horsepower. Why not get all the facts. Call your A-W distributor or write to us now!

# Austin-Western

CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.

BALDWIN · LIMA · HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes

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## FULL TILT ACTION at nearly non-tilt prices!



### ...on MILLER Light Series Tilt-Tops

#### "H-4"

four-ton capacity over-the-wheel platform \$757.00\*

Ideal for especially wide tracks or trucks. Over-the-wheel design offers maximum platform area, 8' x 14', or 16' length or optional extra.



#### "C-4"

four ton capacity between-the-wheels platform \$695.00\*

Extra low loading angle and lower overall height on loaded equipment, are advantages of this between-the-wheels trailer. Handles most large farm tractors.



#### "CT-7"

seven ton capacity tandem axle model \$1255.00\*

Tandem suspension provides heavier carrying capacity without reducing between-wheels platform width of this model.



### LOW COST, FAST HANDLING for rigs under 10 tons

You can cut handling and hauling time on all kinds of smaller rigs with one of these low cost, light series Tilt-Tops. Ideal for the small-job contractor, municipal department crews and large contractor fleets, where the cost of using more cumbersome trailers for job-to-job shuttling of lighter rigs can be saved. See these easy-to-back, faster loading, low-cost TILT-TOPS at your MILLER distributor today!

new capacity range 4 to 2 1/2 tons

# Miller

Tilt-Top Trailer Inc.

456-H So. 92nd Street • Milwaukee 14, Wis.

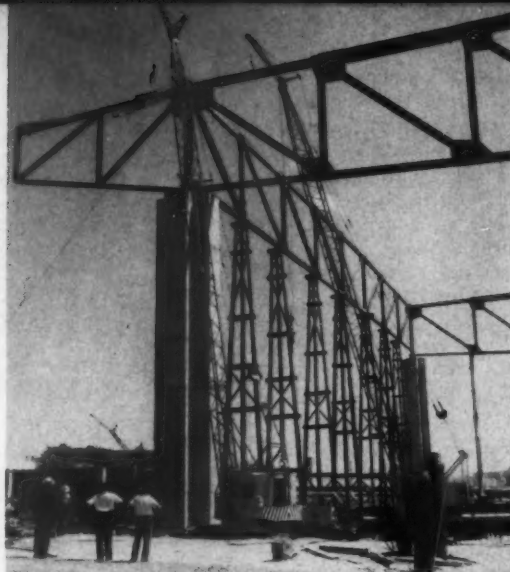
\*F.O.B. Milwaukee, Wisconsin. Complete with platform and tires. Brakes and optional equipment extra. \*Plus 10% Federal Tax

For more facts, use Request Card at page 18 and circle No. 300



# Crews work fast to get new arena under roof

Getting the Portland Memorial Coliseum under roof so that interior work could be done in bad weather was a primary objective of the contractor. The Link-Belt Speeder 25-ton truck crane uses a 95-foot boom and 15-foot jib to set an external cantilever member. The American 599, background, is removing one of the falsework bents from a completed truss.



Crews building Portland's new Memorial Coliseum really poured on the speed to get the big structure under roof before bad weather began. Careful planning and the complete cooperation of the subcontractors were the key factors in the successful race with the weather.

Work is now proceeding on the interior, and the contractor expects to have the big exposition and recreation center ready for use by the scheduled completion date this November.

The new sports and convention facility, which will have more than 138,000 square feet of floor area and will seat up to 13,000 persons, is being built for the city of Portland, Ore., by Hoffman Construction Co., Portland, under a \$5,297,000 general contract. The structure was designed by Skidmore, Owings & Merrill, Chicago and Portland.

## Multi-use facility

The huge arena is completely enclosed within a glass-walled building that is 360 feet square and 100 feet high from the arena floor to the top of the roof. It was this enclosing structure that was the critical factor in the race against time and the elements.

The arena floor occupies the central portion of the structure's ground floor, and it is adaptable for use as an exhibit area, ice rink, basketball floor, or boxing ring. It can also be used to seat 4,000 spectators. Rising like a huge bowl around the arena floor are tiers of seats to accommodate another 9,000 spectators.

In addition to the arena, the ground floor of the building contains ten meeting rooms of various sizes, dressing rooms, shops, areas for storage, commissary, and mechanical equipment, and office facilities. Adjacent to the main building is an exhibit hall measuring 135x389 feet with a connecting corridor structure. Parking is provided on the roof of the exhibit hall and in adjacent lots.

The structure enclosing the arena has glass walls extending from the first-floor level 60 feet up to the bottom of the roof trusses. A massive curtain, electrically operated, will close out the light when it is desirable to darken the building during daylight hours. A monorail window-washing device will be used to keep the glass clean.

The 360-foot-square roof section is composed of three systems of steel trusses supported on four large concrete piers located just inside the corners. These cruciform piers measure 12 feet in each direction and rise 72 feet above their footings. The concrete footings extend another 25 feet down to rock. Each of the legs and the central cores of the piers are hollow. One of these vertical spaces in the southwest pier is used to carry a 30-inch-square elevator that serves as a man lift between the ground floor and the roof.

The two big primary trusses, spanning between the piers in an

## GALION® - rolling down the highways!

Through all stages of road construction, adequate COMPACTION of materials is a factor of highest importance. The achieving of specified densities poses no problem when the proper GALION Roll-O-Matic compaction equipment is used. In the compaction of fill, base, subbase, and finish surface on city streets, rural roads, and super highways—the efficient performance of GALION ROLLERS has for many years made them the preferred choice of contractors and public officials. You, too, can benefit by specifying Galion Rollers and Vibratory Compactor units.

See your Galion Distributor for complete data on the Galion ROLLER RENTAL Plan.

## For Every Need in Compaction

**TWO-AXLE TANDEM ROLLERS**  
3-5, 4-6, 5-8, 8-10½, 8-12 and 10-14 Ton Sizes.

**THREE-AXLE TANDEM ROLLER**  
13-20 Ton Size.

**THREE-WHEEL ROLLERS**  
4 Sizes with Spoke-Type Rolls.  
5 Sizes with Ballastable Rolls.  
Weights 8 to 14 Ton.

**PNEUMATIC-TIRE ROLLER**  
12 Ton, 9 Wheel.

**PORTABLE ROLLER**  
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**VIBRATORY COMPACTORS**  
Three-Wheel Roller with Vibratory Compactor.  
Model 503 Motor Grader with Vibratory Compactor.

**THE GALION IRON WORKS & MFG. CO.**  
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**MOTOR GRADERS • ROLLERS**  
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**PNEUMATIC-TIRE ROLLERS**

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Please send me complete information on the Rollers checked below.

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For more facts, use coupon or Request Card at page 18 and circle No. 302



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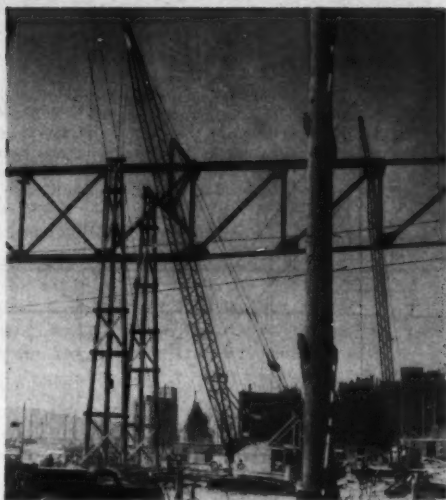
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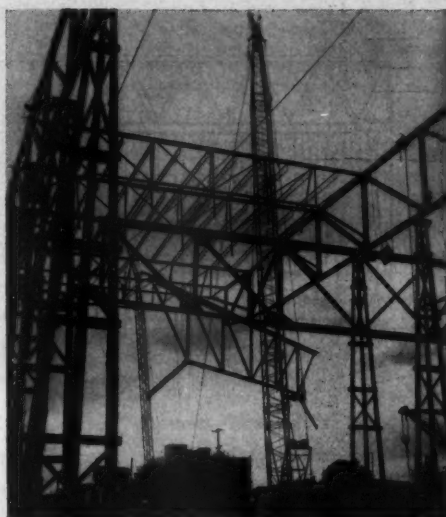
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The secondary trusses of the roof system span between the primary trusses that are attached to the four corner piers. An American 599 with 110 feet of boom and 15-foot jib sets one of the timber falsework bents for this system. In the background, at right, a Link-Belt also sets secondary steel.

Tertiary trusses, assembled on the ground, are raised into position between secondary trusses by an American 599. Note that Macomber joists are already in place in the bents where tertiary trusses have been set. Granco decking and a poured vermiculite slab will complete the roof deck.



east-west direction, are carried on ball-and-socket mountings on the tops of the piers. Composed almost entirely of rolled sections, these trusses have main chords made up of double 16-inch H-beams, producing a section that measures 17 1/4 x 33 inches over all and has flanges 2 1/4 inches thick. This section weighs 420 pounds per foot. The big 16-inch corner posts weigh 470 pounds per foot.

The four secondary trusses span in the north-south direction between the primary trusses, while the tertiary system of trusses spans the 90-foot spaces between the trusses of the secondary system. Macomber joists on the tertiary trusses support Granco decking with a 3-inch-thick poured vermiculite deck.

#### Wet spring slows start

When Hoffman started work on the site, which had been graded previously, crews were handicapped by rain and mud that lasted through the spring and early summer. Footings were constructed despite the weather, but when it came to backfilling, there was no choice but to wait until things dried up.

The 266 bell-bottom caisson footings that support most of the arena and exhibit-hall structures were drilled by P & Z Co. of San Francisco, South San Francisco, Calif., using a Calweld rig. These caissons were drilled 24 and 30 inches in diameter and belled out to 5 feet at the bottom. They averaged 25 feet deep. A few 12-inch pipe piles were driven in an area where the rock lay deeper. The big footings for the four main piers were excavated right down to rock and cast in forms.

Leaving the other footings at ground level with the reinforcing bars protruding, Hoffman concentrated on the casting of the four big piers. These were cast in 10-foot lifts, using a steel and plywood form that was designed by the contractor and fabricated in a local shop. The interior forms for the openings in the piers were designed so that they could be released by pulling wedges with a crane.

Williams cone and rod anchors were left in each lift to support the ledgers on which the forms for the next lift rested. Two sets of forms were fabri-

(Continued on next page)

**10 TONS A MINUTE** *Plus*  
— and —  
the greatest "set-up" flexibility  
and easiest operation and  
maintenance in the industry



No trouble getting around this plant. Yes, ease of operation and maintenance is simplified and made practicable in the new MADSEN Model 567 Base Stabilizer Plant. This view, looking down on the top of the plant shows the generous platforms, railings and toe boards completely around the plant.

✓ CHECK these big MADSEN advantages and features and ask your MADSEN Distributor for details on the new MADSEN Model 567 Stabilizer Plant... the plant that's designed to give you lowest-cost-per-ton production on today's highway and airport jobs.

- CONSTANT HIGH PRODUCTION**...rated at 600 T.P.H. this plant has consistently produced greater tonnage.
- NEW BASIC DESIGN**...provides greater "set up" flexibility.
- UNIT CONSTRUCTION**...for easier transporting and handling.
- FASTER ERECTING, DISMANTLING and TRANSPORTING.**
- GREATER ACCURACY**...in proportioning and control of materials with exclusive MADSEN cement BIN-DICATOR shut-off control.
- EASIER and SIMPLER**...operation and maintenance.
- TWIN-SHAFT, CONTINUOUS-TYPE MIXER**...for faster, more thorough mixing action.
- GREATER EFFICIENCY—LESS MAINTENANCE**...working parts are located at discharge end of mixer away from sifting fines of conveyor belt.

SEE YOUR MADSEN DISTRIBUTOR...OR WRITE DIRECT

#### MADSEN PRODUCTS

ASPHALT PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTORS • ROAD PUG TRAVEL MIX PLANTS • WEIGH BATCHERS • DUST WASHERS • FEED BUNKERS • FEED TUNNELS • ASPHALT TANKS • ASPHALT & FUEL PUMP UNITS • CONCRETE FLOAT FINISHERS FOR AIRPORTS AND HIGHWAYS • HIGHWAY-AIRPORT BASE STABILIZER PLANTS

For more facts, use Request Card at page 18 and circle No. 303

Real money-making output—600 T.P.H. plus... and a long list of MADSEN engineering advantages make the new MADSEN Model 567 Portable Highway-Airport BASE STABILIZER PLANT today's big stabilizer plant news!

You can set up this plant to suit your particular needs. The basic design provides a drive-through-way in either of two directions with a choice of location (either side or the end) for cement silo and feed conveyor.

A degree of mechanical and design simplicity, not found in other stabilizer plants, means faster and easier operation and maintenance which adds profitable tonnage to every day's operation.



*Equipment that Serves*



## MADSEN

### Highway-Airport BASE STABILIZER PLANT

1910 - 1960 50 YEARS—SERVING INDUSTRY

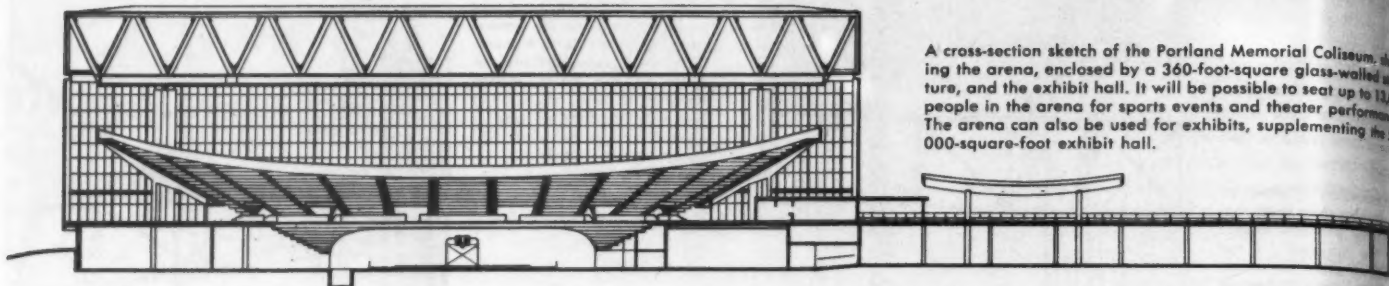
## Madsen Works

Construction Equipment Division  
BALDWIN-LIMA-HAMILTON CORPORATION  
P.O. BOX 36, La Mirada, California

BALDWIN-LIMA-HAMILTON CORPORATION  
P.O. Box 1, Lima, Ohio

MADSEN maintains a complete parts stock  
in Los Angeles and Lima, Ohio





A cross-section sketch of the Portland Memorial Coliseum, showing the arena, enclosed by a 360-foot-square glass-walled structure, and the exhibit hall. It will be possible to seat up to 13,000 people in the arena for sports events and theater performances. The arena can also be used for exhibits, supplementing the 50,000-square-foot exhibit hall.

(Continued from preceding page)

cated, and each was re-used 16 times in building the four piers. The forms were lined with U. S. Plywood Co.'s  $\frac{3}{4}$ -inch Permaply-treated plywood. Concrete was placed by crane and bucket.

As soon as the four piers were completed, the general contractor moved his crews out of the area to make way for the subcontractor on the steel erection. Hoffman's crews then tackled the construction of the exhibit hall, a concrete structure with a prestressed-concrete deck slab. (See "Watertight Parking Deck," page 86.)

#### Steel erection

Steel Construction Co., Portland, subcontractor for the erection of the structural steel, had moved onto the site even before the piers were completed. Its Bay City  $\frac{3}{4}$ -yard motor crane was yarding the steel being delivered by the fabricators, Poole, McGonigle & Dick, Portland.

As soon as the piers were ready, Steel Construction Co. moved in a new American 599 crawler crane on which it mounted 110 feet of boom and a 15-foot jib. Although this rig is rated at 30 tons, its 14-foot-wide crawlers provided excellent stability for lifting the heavy loads (up to 17 tons) high in the air.

Cables were strung from deadmen outside the structure up over the piers and along the secondary truss lines to support the falsework. This falsework consisted of a series of 3-



A workman tightens a high-tensile bolt for one of the roof connections with an Ingersoll-Rand lightweight air wrench. The wrenches, with 1-inch drive, weigh 15 pounds each. Some 33,000 high-tensile bolts of  $\frac{3}{8}$  and 1-inch diameter are required for the steel erection job.

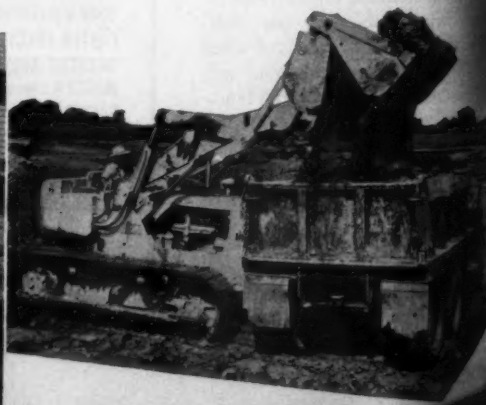
# Take your choice of jobs...



**Take grading, stripping, and spreading jobs**—including those that formerly required costly specialized machines and separate operators! Four-in-One "carry-type scraper" action lets you shave off layers of earth or sod with inch-close accuracy—and lets you precision-spread soil on-the-go. Note how 4-in-1 scraper action "boils" the bowl full, grading for a sidewalk on a new street!



**Take over sticky materials loading jobs** that stop ordinary "roll-forward" buckets cold! Opening the clam pulls the material from bucket surfaces—gravity pull does the rest—to assure positive dumping and positive self-cleanout, even of wet, sticky, clay-type materials! Your sticky materials problem is over with the 4-in-1 and this 2 $\frac{1}{4}$ -cu. yd. TD-15 proves!



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lugged timber pony bents 70 feet high. One bent was placed under each panel point of the primary and secondary trusses while they were being erected. In addition to the cables supporting the pony bents, other cables were pulled in all directions from each of the trusses as they were erected. These cables were maintained on the trusses until concrete for the roof slab had been placed and the anchors were finally welded down at the columns.

When the American crane had erected the primary trusses and the two secondary trusses at the piers,

another crew moved in with a Link-Belt 25-ton truck crane to set some of the lighter steel. This rig had a 95-foot boom and 15-foot jib that enabled it to reach over the top of the big trusses.

The Link-Belt crane first set the cantilever members that overhang 20 to 40 feet outside the piers on all four sides of the building. Portland Wire & Iron Works crews then set the Macomber joists to complete the roof framing.

All of the field connections in the roof trusses were made with  $\frac{3}{4}$ - and 1-inch high-tensile steel bolts. The



Ross R. Vickers, left, project superintendent for Hoffman Construction Co., and Kelly Wellington, construction inspector representing the owner and architect, talk over some points of the job.

bolting crews used Ingersoll-Rand and Chicago Pneumatic lightweight air-powered wrenches. These wrenches with 1-inch drive weigh only 15 pounds each.

Some of the other subcontractors whose cooperation kept the job going at full speed were Howard Angell on the earthwork, Lord Bros. on the mechanical work, Grasse Electric Co. on the electrical installations, and Universal Corp. on the big window walls.

#### Personnel

Hoffman Construction Co.'s supervisory staff includes job superintendent Ross R. Vickers, general foreman Harry Shaw, labor foreman Al Guyll, and carpenter foreman Del Doering. On the drilling of the foundation caissons, Bob Cook served as superintendent for P & Z Corp. Superintendent for Steel Construction Co. on the steel erection was Stan Bergeman, with Clyde Wells serving as erection engineer.

Representing Skidmore, Owings & Merrill on the work is construction inspector Kelly Wellington. The construction and operation of the facility are handled for the city of Portland by an Exposition-Recreation Commission appointed by the City Council. Don Jewell is general manager for the commission, and Roy Nelson is operations director.

THE END

# s...and "take" your competition

## ...WITH EXCLUSIVE

# 4-in-1

## CLAM-ACTION...

You can take slam-bang jobs, like old pavement removal, from far costlier boom-type rigs—using International Drott 4-in-1 power-shovel-like excavating force. See how this 3-cu. yd. TD-20 Four-in-One digs up reinforced concrete slab, tons at a time—applying up to 43,150 lbs. of famous pry-over-shoe break-out power!

See how industry-topping 4-in-1 work capacity—plus the tremendous work range of its built-in "equipment spread" of machine actions—equips you to take your choice of jobs!

Move the "job-action selector"—prove 4-in-1 ability to "take" competition—be it "single-action" loader, or a yard-full of other limited duty rigs. Compare exclusive shock-swallowing Hydro-Spring advantages, for positive performance protection. Let your International Drott Distributor demonstrate the 4-in-1 size you need. Five big-capacity sizes:  $\frac{3}{4}$ ,  $1\frac{1}{2}$ ,  $2\frac{1}{4}$ , and 3 cu. yd.!



"Take" your bulldozer competition with 4-in-1 'dozer action—which can duplicate the performance of a full-sized blade in capacity, work range, and accuracy of control! Here, an excavating contractor is rolling the earth with his  $1\frac{1}{2}$ -cu. yd. TD-9 Four-in-One's bulldozer action on landscaping work! Operator regulates dozing depth accurately with hydraulic "radius control!"

International Harvester Company, Chicago 1, Illinois  
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



# INTERNATIONAL

## DROTT

For more facts, use Request Card at page 18 and circle No. 304

#### Bethlehem Steel offers booklet

A fact booklet, "This Is Bethlehem Steel," is available from the Publications Department, Bethlehem Steel Co., Bethlehem, Pa. The 25-page booklet describes and pictures the company's various operations, products, and facilities.

#### RCA promotes manager; erects new plant

Norman Caplan has been named to head industrial electronic products activity in the Washington-Canonsburg, Pa., area for Radio Corp. of America, Camden, N. J. He will be responsible for over-all supervision of the present RCA plant in Canonsburg and of the new plant planned for a 50-acre site near Washington, Pa. Continuing in his current post as manager of the communications products department of the Communications & Industrial Electronic Products Operations Division, Caplan will be located first in Canonsburg and subsequently in Washington.

The Canonsburg plant will continue in operation for the present.

#### Eimco appoints manager

Charles Mitchell has been appointed sales manager, Latin America, Tractor-Loader Division, The Eimco Corp., Salt Lake City. He will have headquarters in the home office.



## Avoid legal pitfalls

### Owner's liability as to excavation

**THE PROBLEM:** A party wall collapsed due to excavation by one owner in constructing an adjacent building. The owner's contract with the builder impliedly recognized that such damage might occur by binding the latter to indemnify the owner against liability. The aggrieved co-owner sued the other and the contractor for damages, but dismissed the suit as to the contractor. Was the contractor an essential party?

**THE ANSWER:** No. (Casper National Bank v. Jones, 329 Pac. 2d 1079, decided by the Wyoming Supreme Court.)

The court decided that the employer of the contractor was primarily liable for damages in the absence of proof that damage would not have occurred if plans and specifications were followed by the contractor. The court cited a decision by the Missouri Supreme Court to the effect that, in such a case, if plans and specifications are themselves sufficient to secure safe construction, and an independent contractor fails to follow them, the owner should not be held liable for resulting damage.

### Masonry subcontract caused a lawsuit

**THE PROBLEM:** The prime contractor on an abbey construction job in Kansas sublet the masonry work. The subcontractor sued to collect pay for interior and exterior cleaning of the masonry and for altering anchor holes in stone. Did the trial judge err in (1) summarily dismissing the claim for cleaning, and (2) in reducing a jury's award of damages for altering anchor holes?

**THE ANSWER:** Yes. (J. T. Majors & Son, Inc., v. Lippert Bros. Co., Inc., 263 Fed. 2d 650, decided by the United States Court of Appeals, Tenth Circuit, in setting aside a judgment of the United States District Court for Kansas.)

The mere fact that the prime contract required the contractor to clean brickwork did not impose that obligation on the subcontractor. The subcontract for labor to install masonry work itemized the work and provided for compensation on a unit basis but was ambiguous as to what the parties meant by "install," and the trial judge's rejection of evidence as to preliminary negotiations between parties was improper.

The jury should have been permitted to decide whether the prime contractor's construction superintendent had authority to bind the prime contractor by orally contracting with the subcontractor for the cleaning.

If the subcontract did not require the subcontractor to clean masonry, but the prime contractor knowingly permitted the subcontractor to do it and accepted the benefits, the subcontractor might be entitled to col-

lect from the prime contractor for the cleaning work.

It was also for the jury to decide whether the prime contractor intended to waive or modify a provision of the subcontract barring oral agreements for extra work or changes.

The jury awarded the subcontractor \$4,322.73 on a claim for altering anchor holes. The Court of Appeals ruled that the trial judge erred in

cutting the award to \$1,688.80. The evidence on this phase of subcontractor's claim held that, in constructing a stone wall of the type involved, each stone must be fastened in the wall by metal rods—anchors and clamps. The stones made available to the subcontractor had holes for these rods, but they were too small and were improperly shaped for the rods that were furnished. The subcontractor was required to alter the holes so that the rods would fit.

The dispute between the parties concerned the number of holes that had to be altered. The Court of Ap-

peals said that the evidence warranted the jury's finding in the subcontractor's favor on this point and that the trial judge erred in reducing the award.

### Injuries caused by wind

**THE PROBLEM:** Can liability for injury caused by a combination of faulty construction and a windstorm, no more violent than usual for the season, be avoided on a ground that the injury was caused by an "Act of God"?

**THE ANSWER:** No. (Cachick v.

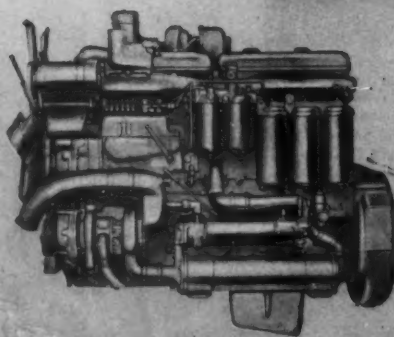


Keep full loads on the move full time with exclusive Planet Power-steering. Full power on both tracks, full time, is the answer! And Hi-Lo on-the-go power-shifting lets you match power to condition, instantly, and keep the yard-boosting advantage of uninterrupted momentum.

You speed-up all four steps of the push-loading cycle with TD-25 torque-converter and planetary system teamwork! 1) You slow down by power-shifting down and using decelerator to get feather-touch contact; 2) power-shift either track up or down to maintain solid pusher contact on curves; 3) get gear-higher kick-outs, with on-the-go power-shifting; 4) reposition faster, with higher-than-ordinary reverse! Two "25's" tandem-pushing the International 295 Payscraper®, and the third, scarifying, belong to contractor Ed Bentley, Sylacauga, Alabama — building superhighway near Birmingham.

**PLANET**  
**Power-steering...**  
**HI-LO**  
**power-shifting...**  
**COME AS**  
**standard equipment**  
**ONLY**  
**in the new TD-25**

The International DT-817 engine—single power source used in both pushers and scrapers—on industry first in power standardization. You'll find this big new direct-start, 6-cylinder turbocharged diesel powering the full line of International two and three-axle Payscrapers; Paywagons®, and end-dump Payhaulers.® Plus the new TD-25! Dual valving of this high-torque, 230-hp power plant provides for peak turbocharging efficiency, to develop full power from sea level to timberline!





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United States, 161 Fed. Supp. 15,  
decided by the U. S. District Court,  
Southern District of Illinois. The case  
is reviewable by a higher court, the  
United States Court of Appeals.)  
Several persons who had been in-  
jured when a grandstand at a mili-  
tary base collapsed in a thunderstorm  
sued for damages. The District Court  
decided that the government was li-  
able because it was negligent in fail-  
ing to anchor the structure suffi-  
ciently to the ground.  
The court said that the mere fact  
that a high wind was blowing did not  
make collapse of the stand an Act of

God so as to exempt the United  
States from liability, since the col-  
lapse resulted from negligence in con-  
struction that permitted the structure  
to be overthrown by a wind that was  
not unprecedented. A loss or injury is  
due to an Act of God when it is oc-  
casioned exclusively by natural causes  
that human care, skill, and foresight  
cannot control.  
  
**Valuing gravel deposits**  
  
THE PROBLEM: The state of Utah  
condemned for highway purposes an  
8-acre tract having gravel deposits

595 feet deep. Were the landowners  
entitled to have the valuation deter-  
mined by multiplying the estimated  
tons of sand and gravel on the prop-  
erty by the estimated net price per  
ton that might be realized on future  
sales?  
THE ANSWER: No. (State of Utah  
v. Noble, 335 Pac. 2d 831, decided by  
the Utah Supreme Court.)  
But the court ruled that the quan-  
tity and quality of sand and gravel  
on the property, together with prob-  
able net profits from future sales,  
could be considered in arriving at the  
fair market value of the property.

**Edited by A. L. H. STREET**  
**Attorney-at-Law**  
  
These brief extracts of court decisions  
may aid you. Local ordinances or state  
laws may alter conditions in your  
community. If in doubt consult your  
own attorney.

**Contractor claims  
damages due to delay**

THE PROBLEM: A municipal housing  
construction contract specified that  
no payment would be made for dam-  
ages because of hindrance and delay  
of the contractor during progress of  
the work, whether or not the hin-  
drance or delay was unavoidable. Was  
operation of this clause limited to  
delays resulting from exercise of bad  
faith by the contracting authority?  
THE ANSWER: No. (Anthony P. Mil-  
ler, Inc., v. Wilmington Housing Au-  
thority, 165 Fed. Supp. 275, decided  
by the United States District Court  
for the District of Delaware.)  
The contractor unsuccessfully  
claimed that the clause did not ex-  
empt the contracting authority from  
liability for stoppage work because  
union laborers employed by one prime  
contractor refused to work side by  
side with nonunion laborers employed  
by another contractor. He also tried  
to hold the authority liable because  
it failed to maintain a responsible  
representative at the project site  
and thereby delayed decisions on  
questions involving performance of  
the contract; because it unreasonably  
delayed approval of subcontractors'  
materials and shop drawings; un-  
reasonably delayed action on change  
orders and failed to coordinate the  
work of the prime contractors; and  
delayed payments due the contractor.

**Agreements to arbitrate**

THE PROBLEM: Owners sued a con-  
tractor for damages for delayed com-  
pletion of construction. The contrac-  
tor claimed that the suit should be  
dismissed because the contract pro-  
vided for arbitration of disputes be-  
tween the parties. Was the suit dis-  
missible?  
THE ANSWER: No. (McClendon v.  
Shutt, 115 So. 2d 741, decided by the  
Mississippi Supreme Court.)  
The court decided that, because  
there was no statute in Mississippi  
making such an arbitration agree-  
ment irrevocable, either party could  
withdraw from the agreement at any  
time before an arbitration award was  
made.  
It was noted that in New York and  
California such agreements are made  
binding by statute, but that in the  
absence of such a statute, the courts  
generally recognize that a common-  
law rule applies. This rule holds that  
a general agreement to submit to  
final determination by arbitrators the  
rights and liabilities of the parties,  
with respect to any and all disputes  
that may thereafter arise under the  
contract, is voidable at the will of  
either party any time before a valid

standard equipment at no extra cost, the new  
40-hp TD-25 gives you the International®-proven  
control combination that has been beating king-sized  
steered crawlers in yardage for years!  
You get combined Planet Power-steering and Hi-Lo  
on-the-go, power-shifting exclusively in the new  
International TD-25. And you get this basic, built-in  
design advantage in your choice of torque-converter  
synchromesh model!  
With this and all its other big advantages, the TD-25  
outearn other big rigs up to 50%—on push-load-  
ing, and pulling big drawbar tools such as shale-shat-  
tering scarifiers!  
No "dead-track drag" or "gear-shift lag"!  
Planet Power-steering gives you full-time "live" power  
and traction on both tracks, to make full-load turns—  
and to eliminate load-limiting "dead-track drag." And

Hi-Lo on-the-go power-shifting instantly matches pow-  
er to conditions to prevent load-losing "gear-shift lag."  
Hi-Lo power-shifting makes the TD-25 the indus-  
try's only 4-speed torque-converter crawler and the  
only one with load-matching efficiency-range control.  
In the synchromesh transmission "25" the Hi-Lo plan-  
etary system gives eight speeds forward and reverse—  
with cycle-speeding, up-or-down, on-the-go power-  
shifting with "finger-tip" ease!  
  
Power-shift and power-steer the new "25" with full  
king-size loads—around curves, upgrade, anywhere.  
Prove what it means to command full-time, full-load  
ability to outearn clutch-steered king-sized crawlers,  
up to 50%. Measure all the "25's" standard equipment  
extra value features! See your International Construc-  
tion Equipment Distributor for a demonstration!



**International  
Construction  
Equipment**



International  
Harvester Co.,  
180 North  
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A COMPLETE POWER  
PACKAGE: Crawlers and  
Wheel Tractors... Self-  
Propelled Scrapers and  
Bottom-Dump Wagons...  
Crawler and Rubber-Tired  
Loaders... Off-Highway  
Haulers... Diesel and  
Gasoline Engines... Farm  
Tractors and Equipment.



## avoid legal pitfalls

award is made. It will not be enforced by the courts, because of the rule that private persons cannot, by a contract to arbitrate, oust the jurisdiction of the legally constituted courts.

### Embankment measurement

**THE PROBLEM:** A large intercepting city sewer was placed in an embankment on the surface, under a contract calling for payment for the embankment on a cubic-yard basis. Was the contract so worded as to call for exclusion of the volume occupied by the sewer and the void within it?

**THE ANSWER:** Yes. (*Acchione v. City of Philadelphia*, 149 Atl. 2d 125, decided by the Pennsylvania Supreme Court.)

The controlling clauses of the contract read:

"The price bid per cubic yard for embankment shall include the clearing of the site, removal of existing brick bulkheads, refill, excavation, filling, and compacting between the present surface of the ground and the bottom of the sewer, the use of sheathing and shoring, pumping, fluming, cofferdaming, and trenching.

"Embankment shall be 22 feet wide at the top, placed to a depth of 2 feet above the top of the sewer with side slopes of 1½ horizontal to 1 vertical, extending to the original surface of the ground. Payment for embankment will be based upon these

lines, and any material placed beyond these lines will not be measured for payment.

"Excavation, whether above or below plan depth, will not be paid for as excavation, but shall be included in the price bid for embankment."

### Asphalt-plant operation

**THE PROBLEM:** A farmer sued a construction company for damages caused by a nearby hot asphalt plant. The substance of plaintiff's claim, alleged in detail, was that the defendant knew, or should have known, that its operations would cause clouds of dust to be blown on plaintiff's property, and that the plant was operated without adequate dust collectors or similar devices that would have prevented unreasonable quantities of

For more facts on Insert, circle No. 306

lime dust from blowing onto and damaging the property. Did plaintiff allege facts which, if bolstered by proof, would entitle him to damages?

**THE ANSWER:** Yes. (*Lutz v. Independent Construction Co.*, 333 Pac. 2d 269, decided by the Kansas Supreme Court.)

### Right to extra costs

**THE PROBLEM:** On the evidence presented, in a contractor's suit against the government to collect pay for extra costs on a hospital job, was the contractor entitled to judgment?

**THE ANSWER:** Yes. (*Ring Construction Co. v. United States*, 163 Fed. Supp. 190, decided by the United States Court of Claims.)

As to a claim based upon a requirement by the government that more expensive material be used than was called for by the contract, the contractor was entitled to recover on the ground that its interpretation of ambiguous provisions of the contract permitted it to use gypsum tile instead of the more expensive hollow-clay tiling in the construction of flooring at exterior walls and around steel columns.

The contractor was also entitled to collect extra pay for the pointing of masonry walls in the elevator and dumbwaiter shafts. Specifications did not require this, but inspectors of the government required orally that the walls be pointed.

However, the court said that, ordinarily, a bidder on a construction project should call attention to an obvious omission in a specification and should make certain that the omission was deliberate, if he intends to take advantage of it.

### Unlicensed contractors

**THE PROBLEM:** A contractor not licensed to build sidewalks contracted with a realty company to build walks and arranged with another contractor, who had a license, to build the walks. The latter obtained the necessary municipal permit to install the walks, and the contractors did the work together. Each paid his own employees. An employee of the unlicensed contractor was injured while performing a task ordered by the licensed contractor. Were the contractors jointly liable to the injured man for the payment of workmen's compensation for the injury?

**THE ANSWER:** Yes. (*Snyder v. Industrial Commission of Colorado*, 190 Pac. 2d 543, decided by the Colorado Supreme Court.)

The unlicensed contractor did not let part or all of the work to the licensed contractor, so the licensed contractor was not a "statutory employer" of the injured employee under the Workmen's Compensation Act. Both contractors were engaged as principals in a joint enterprise and were jointly responsible under the act if they had the necessary number of employees, and if the injuries arose out of and in course of employment.

## 9 years of field service prove safety and long life of Fatigue-resistant Tiger Brand Boom Support Assemblies

Nine years ago, American Steel & Wire Division introduced a *fatigue-resistant* Tiger Brand Wire Rope Boom Support Assembly. It was designed to combat the severe vibration on power shovels, draglines and cranes. Since then, it has been installed on thousands of machines with outstanding success.

**Effectively dampens vibration.** The spliced section gradually dampens vibration instead of concentrating it at one point. This results in greater safety and much longer cable life.

**Visibility increases safety.** With this construction, inspection is easy and the development of broken wires is readily detected. They are not hidden in a shank or socket basket. Thus, you can tell when to replace the assembly in time to prevent accidents.

**Easy application.** There's no need for extensive alteration of your present equipment. Tiger Brand Wire Rope Boom Support Assemblies are made with standard-size fittings. These are completely interchangeable on standard equipment. For further information, contact our nearest office or write American Steel & Wire, Dept. 0160, 614 Superior Ave., N. W., Cleveland 13, Ohio.

USS and Tiger Brand are registered trademarks



Greater safety—20% longer service life was obtained from these Tiger Brand Boom Support Assemblies used on a crane owned by the Hunkin & Conkey Construction Co. in Ohio.

➤ Vibration is effectively dampened by these Tiger Brand Boom Pendants with spliced ends. The splice can be readily inspected for broken wires—an added safety factor.



**American Steel & Wire  
Division of  
United States Steel**

Columbia-Gerres Steel Division, San Francisco, Pacific Coast Distributors  
Tennessee Coal & Iron Division, Fairfield, Alabama, Southern Distributors  
United States Steel Export Company, Distributors Abroad

—For more facts, circle No. 306



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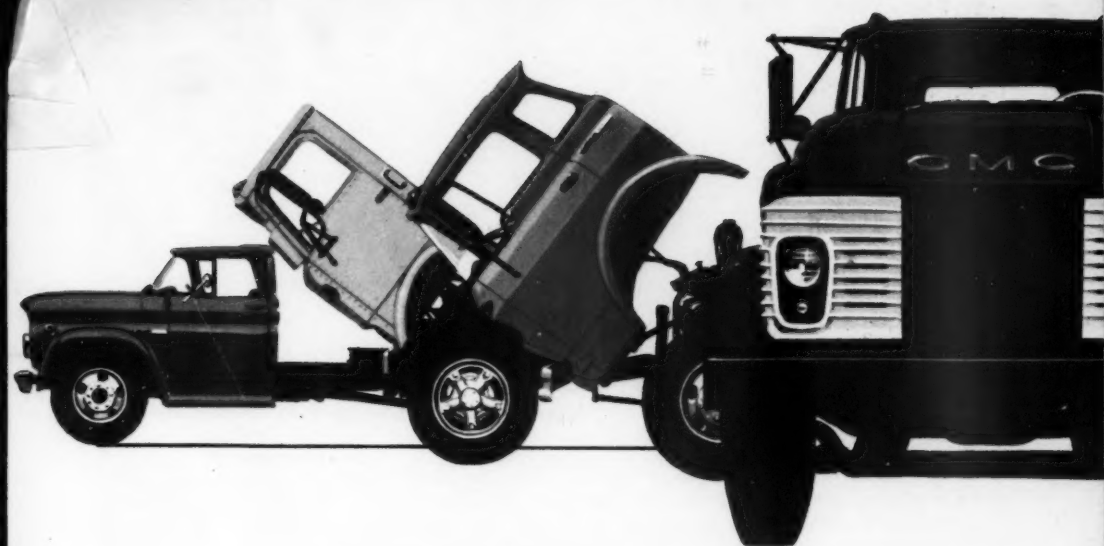


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Here are the reasons why

**GMC TRUCKS  
ARE CUTTING  
CONTRACTORS' COSTS  
ACROSS THE  
NATION!**

**NEW EXTENDED-LIFE ENGINES**

**NEW, STRONGER, MORE DURABLE CHASSIS**

**NOW, WIDE RANGE OF EXTRA-LIFE CABS**









### **CONTRACTORS FAVOR NEW EXTENDED-LIFE V-6 ENGINES!**

Here's why—these exclusive, rugged engines produce full, usable torque at low, life-saving speeds . . . cut wear and increase fuel economy. Accurately







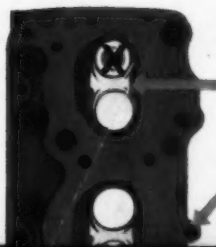




## CONTRACTORS FAVOR NEW EXTENDED-LIFE V-6 ENGINES!



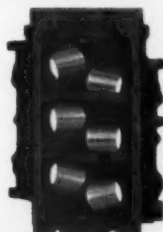
Here's why—these exclusive, rugged engines produce full, usable torque at low, life-saving speeds . . . cut wear and increase fuel economy. Accurately controlled dynamometer and road tests indicate these advanced engines have a life potential of up to 200,000 miles of continuous operation without a major overhaul . . . with the proper maintenance and application.



**Completely machined combustion chambers** assure equal displacement in each cylinder for smoothest power. There are no destructive "hot spots" due to uneven carbon build-up.

**6 bolts around each cylinder** (not 4) make a positive head-to-block seal and practically eliminate bore deflection.

**Wide bridge** (shown with valve)



**High-strength, rigid engine block!** New short V-6 block, extra strong inner ribbing, staggered cylinders, deep skirt 3" below crankshaft centerline—all give greater rigidity, add years of life to components.

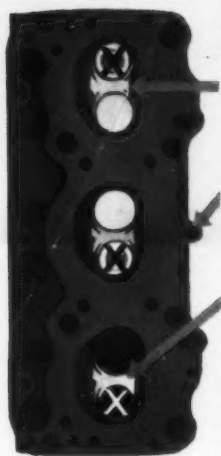
NEW GMC GAS ENGINES







controlled dynamometer and road tests indicate these advanced engines have a life potential of up to 200,000 miles of continuous operation without a major overhaul . . . with the proper maintenance and application.

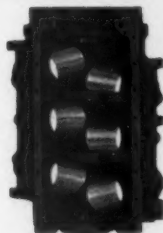


**Completely machined combustion chambers** assure equal displacement in each cylinder for smoothest power. There are no destructive "hot spots" due to uneven carbon build-up.

**6 bolts around each cylinder** (not 4) make a positive head-to-block seal and practically eliminate bore deflection.

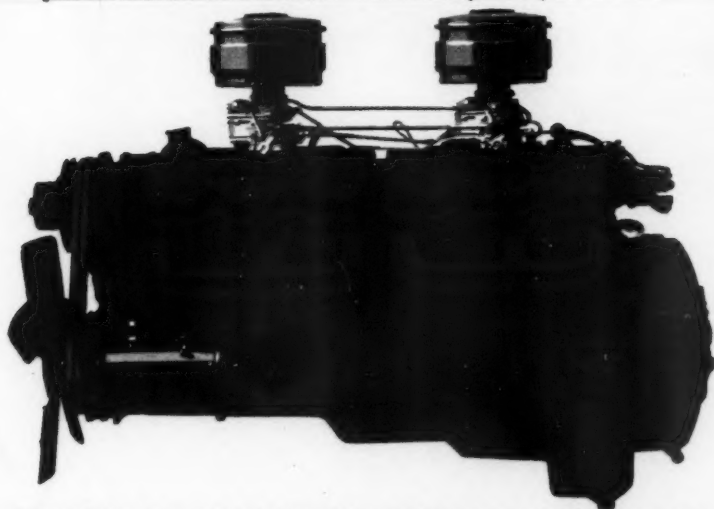
**Wide bridge** (shown with valves removed): permits better cooling, up to 3 times more water circulation for faster heat transfer and greatly increased valve life.

Note: No two exhaust valves (X) are adjacent. This prevents heat concentration and extends valve life.



**High-strength, rigid engine block!** New short V-6 block, extra strong inner ribbing, staggered cylinders, deep skirt 3" below crankshaft centerline—all give greater rigidity, add years of life to components.

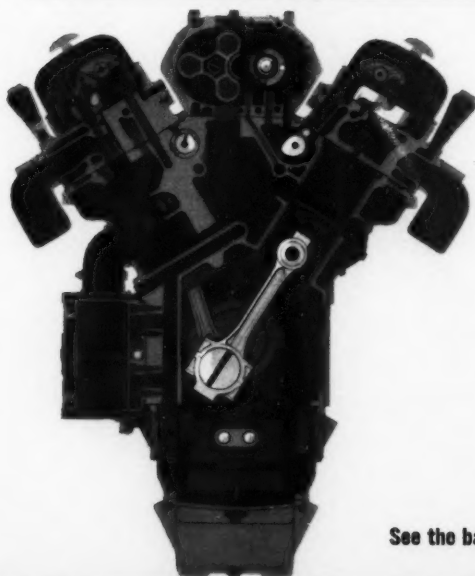
NEW GMC GAS ENGINES PROFIT-PERFORMANCE ON EVERY HAUL		
Model	Gross Torque Range	Max. Horsepower
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	205 @ 3200
702	625-630 @ 1400-2100	275 @ 2400



## NEW TWIN-SIX MOST PULLING POWER OF ANY STANDARD GAS ENGINE!

Now contractors are getting 625-630 pounds-feet torque over an extended 700 rpm range! This is all the working power and reserve power needed to get the biggest construction loads moving—and keep them rolling—with least gear shifting.

It has proved to be lasting power, too. Maximum governed engine speed is only 2400 rpm. This low-stress, easy-stroking speed greatly extends engine life, cuts operating costs to the bone.



## NEW V-6 DIESELS MORE POWER PER DOLLAR!

Proved, efficient 2-cycle design with power on every downstroke gives you more power per dollar, more power per pound, more power per cu. in. displacement! New 6V-71 engines have all the proved performance, economy and durability features of the famous 6-71SE Series, the power plants that have set new time-saving and money-saving records in hundreds of millions of miles of operation.

POWER-MATCH YOUR JOB WITH THESE NEW GMC DIESELS		
Model	Max. Torque	Max. Horsepower
6V-71	577 @ 1200	189 @ 1800 210 @ 2100*

\*No extra cost

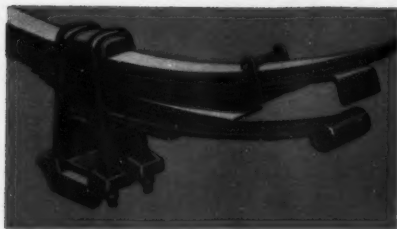
See the back page for the most advanced trucks in 20 years!

# NEW EXTENDED-LIFE ENGINES









**New vari-rate rear suspension—standard equipment on 4-wheel models!** You get longer life with GMC's new 3-inch-wide rear springs because they are under less stress. Braking and torque forces are directed to the frame by radius-rod leaf. New, progressive cam action adjusts to the load for an easier ride.





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**Totally new frames ... up to 35% stronger!** Unique design, stronger and lighter materials guarantee extra payload every trip and extra durability on your hauling job. 5500 series and up have new, extra-strength SAE 950 hi-tensile steel frame standard. New L-type reinforcements are also stronger.

**Bigger payloads, less maintenance!** With this new GMC tandem suspension, you have less unsprung weight, less truck weight for bonus payloads. Rubber mounts and bushings at all wear points practically eliminate service. True alignment of axles and equal load distribution at all times increase tire and axle life.

**New, stronger, wider track front axles!** New high-capacity, longer-life front axles have as much as 12" wider track, wider spring centers for increased stability, shorter turning and improved handling.



**Smoother ride, easier handling for 1960!** With GMC's new independent front suspension, standard on 4-wheel models through 25,000 GVW, each wheel acts separately to better absorb shocks. You get increased road stability and reduced steering friction. Lighter-duty models have maintenance-free torsion bar springs standard.

See the back page for the most advanced trucks in 20 years!

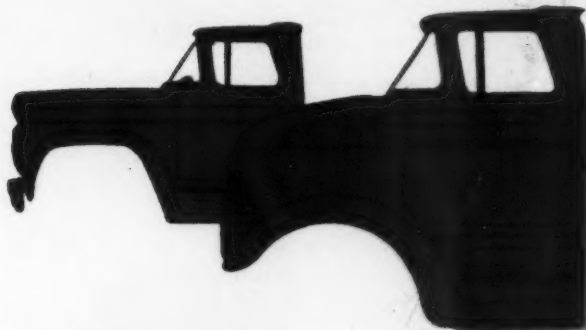
**NEW, STRONGER, MORE DURABLE CHASSIS**





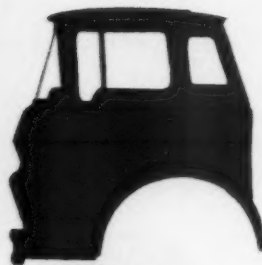


## CABS FOR EVERY LOAD, ROAD AND LAW



CONVENTIONAL

Traditional standby for general all-round service. This year, the new GMC 105" BBC cab has wider seats, more head and legroom inside, yet up to 10" lower outside. Bigger windshield gives you more safety vision. New suspended pedals mean easier driving and better cab sealing.



BBC CONVENTIONAL

This is the increasingly popular new 90" BBC conventional-type GMC cab . . . ideally built to mount big-payload dump bodies, flatbeds and all construction bodies. Greater front axle loading gives better weight distribution for bigger construction hauls.



BBC CAB

With 72" BBC and front axle set-back 52", you have less over-all length and shorter wheelbases to mount longer bodies, haul longer trailers. More weight on the front axle means you can carry bigger payloads. Turning circles are shorter, too. Front vision is the best you can get.

## QUICK, EASY SERVICING









## QUICK, EASY SERVICING



New GMC Conventional Ninety-Inchers speed maintenance and cut costs with the exclusive 3-piece side-opening hood and swing-out grille sections that expose the entire engine compartment.

Manually tilting of GMC's steel tilt-cabs is quick and easy with assist of torsion bar spring. Engine and all accessories are right out in the open for convenient servicing. Stationary island keeps controls in proper alignment and adjustment at all times.

## DELUXE QUALITY IS STANDARD

For 1960, GMC is giving contractors all these extra-value features at no extra cost: foam-rubber seats, easily-removed instrument clusters for convenient servicing, steel-framed door windows to prevent chipping, rust inhibitor between door panels, and new 777 Super Enamel that keeps its luster longer, gives greater rust protection than previous finishes.



## NEW, EXTRA-LIFE CABS

New GMC cabs will stand up for many years even on the most rugged hauls. This greatly extended on-the-job durability is the result of full double-wall construction, extra-heavy reinforcing inside the cab, and special, sturdy understructure—as shown above.

◀ TEAR OUT HERE—See the back page for the most advanced trucks in 20 years!

WIDE RANGE OF EXTRA-LIFE CABS





**Highest performance of any gas-engine tilt-cab!** This LW7000 Series is powered by the exclusive Two-Stroke 625-630 pounds-feet torque at 1400-2100 rpm. Easy-to-drive steel tilt-cab trucks meet the hauling demands from 19,500 lbs. GVW to 76,000 lbs. GCW.



**Increased front axle loading, bigger brakes, from 35% stronger** are just a few of the advantages coming with the industry's first and only full line of trucks. With choice of responsive, extended-life V-6 Six gas engines and fuel-saving, high-performance V-8 you can power-match new Conventional Ninety-ton every construction haul, 19,500 lbs. GVW to 120,000 lbs.

**Contractors' favorite pickups—with good reasons.** Only new GMC pickups have more durable cabs; new smoother-riding independent front suspension, exclusive new V-6 power. You can choose from 34 combinations, including rugged 4-wheel drive models.



From 1/4-ton to 60-ton...

General Motors leads the way!

**New from the BIG GMC BREAKTHROUGH in truck engineering...a complete new line of "Cost-Breakers" that drastically cut your operating costs, increase payloads and last longer on your hauling jobs. See your GMC Dealer for actual proof. He's in the Yellow Pages.**

GMC Truck & Coach—a General Motors Division—Pontiac



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A CRANE DELIVERS PREFAB FORMS for the new Christ Community (Evangelical) Hospital in Oak Lawn, Ill. On each floor the Symons forms were moved in quantity by a crane, which circled the building as the forming of the beams progressed. The outside forming consisted of a 6-foot panel, with only two flat ties required in erection of the opposite 4-foot panel. One of the hardest things to form was an elevator pit that consisted of several rectangular shapes. The forms were suspended from horizontal lumber that was supported by the outside formwork. This eliminated the need for shoring or supporting of inside forms from underneath, permitting movement of concrete without interference.



#### AS bulletin discusses landslides, foundations

Bulletin 236, "Landslide and Foundation Investigations and Stability Analysis," contains three papers. The first one, on the methodology of landslide investigations in Soviet Russia, describes the work being done by special field stations located near areas of slow-moving slides or in regions with abundant slides.

A paper on soil and foundation investigations on the Patapsco Tunnel project in Maryland describes the design-engineering report, the design-phase checks, and the maintenance and operation procedures and their relationship with the embankment and foundation work of the tunnel and approaches. The last paper, on mathematical expressions for the circular method of stability analysis, gives the derivations for various conditions usually met in applying the method to field problems.

Price of the 68-page bulletin is \$1.00. It may be purchased from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

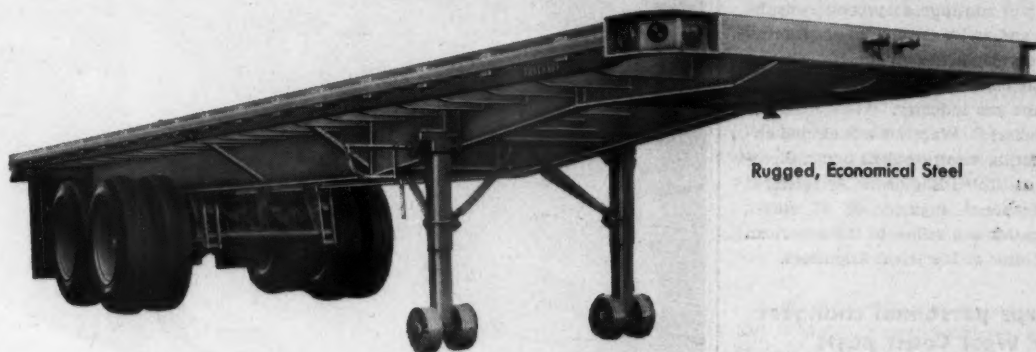
#### arden State Parkway map for 1960 available

The tenth edition of the official Arden State Parkway (N. J.) map is available from toll booths or from the Public Relations Division, N. J. Turnpike Authority, 12 Broad St., Newark, N. J. The 1960 issue again features the "Send Help" sign panel for drivers in distress. In the new edition, the list of state parks, forests, and historic sites has been expanded.

#### opens inspection in Michigan

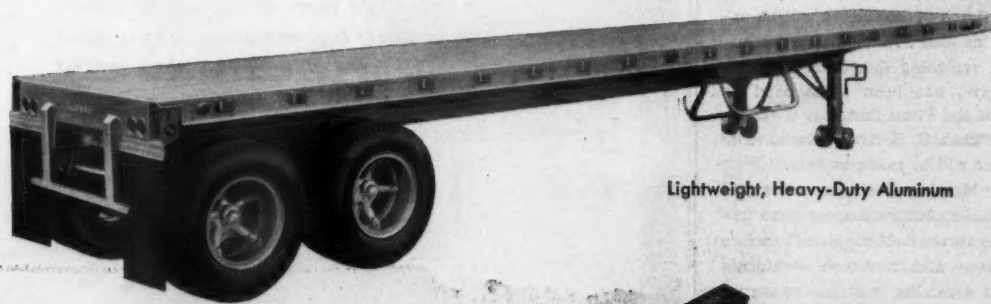
The U. S. Army Engineer District Detroit has opened an area inspection office at Niles, Mich. The office will furnish inspection services to firms having government contracts in the western half of Michigan and the northern part of Indiana.

James J. McGrogan, assistant chief of the inspection section of the Detroit Division, will be in charge of the office.



Rugged, Economical Steel

## TWO POWERFUL NEW LIGHTWEIGHT FRUEHAUF WORKHORSE PLATFORMS!



Lightweight, Heavy-Duty Aluminum

New ruggedness . . . New weight savings . . . New features . . . New interchangeability of steel and aluminum components—both crossmembers and side rails . . . Deep steel main members, deepest where the load is greatest . . . One-piece I-beam crossmembers fitting through the main frame—Integral rubrail . . . Recessed, protected lights of a new, impact-resistant design . . . New, lightweight, self-lubricating Square Leg 2-speed supports . . . Heavy duty aluminum or hardwood floors . . . Tapered stake pockets . . . Optional, independently removable aluminum racks with steel posts . . . Wide choice of economical, maintenance-free suspensions . . . The lightest weight platforms for their strength ever built!



For Forty-Six Years—World's Largest  
Builder Of Truck-Trailers!

**FRUEHAUF TRAILER COMPANY**  
10940 Harper Avenue • Detroit 32, Michigan  
SEND THE FULL STORY ON THE AMAZINGLY STRONG,  
AMAZINGLY LIGHTWEIGHT NEW WORKHORSE PLATFORMS!

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City \_\_\_\_\_ State \_\_\_\_\_

For more facts, use coupon or Request Card at page 16 and circle No. 308



## Names in the News



John T. Pinkston (left), vice president, and Robert R. Wagstaff, engineering vice president and a director of United Engineers & Constructors Inc.

### United Engineers elects two top executives

John T. Pinkston has been elected a vice president of United Engineers & Constructors Inc., Philadelphia. He will continue as process consultant and will be in charge of all process development activity. He will also be in charge of the firm's activities in the gas industry.

Robert R. Wagstaff was elected engineering vice president and a director of United Engineers. A registered professional engineer in 14 states, Wagstaff is a fellow in the American Institute of Electrical Engineers.

### Corps personnel changes for West Coast posts

Col. Robert R. Robertson will be deputy division engineer for the South Pacific Division, succeeding Col. Carleton M. Clifford, who will retire on July 31. Col. Robertson will supervise all of the Corps' military construction in Arizona, California, Nevada, and Utah, and will check flood-control and navigation work.

Col. John A. Morrison of the U. S. Army Corps of Engineers will be assigned as San Francisco district engineer, replacing Col. John S. Hartnett, who has been transferred as chief of the Plans Division, G-4 Section, Eighth U. S. Army, Korea. The transfer will be made in July.

Col. Morrison will supervise the civil-works construction program under way throughout the San Francisco Bay area and northern California coastal area. For military construction, his operations will include part of northern California, Clark and Lincoln counties in Nevada, and the entire state of Utah.

Col. Charles B. Schweizer, district engineer for the St. Louis district, leaves that post in July to attend the Army War College at Carlisle Barracks, Pa.

### Stone & Webster names

John J. Niland has been appointed assistant engineering manager of Stone & Webster Engineering Corp., Boston and New York City. He has served as assistant to the president of Associated Nucleonics, Inc., a Stone & Webster subsidiary engaged in atomic-energy work.

Ralph A. Larsen has been appointed chief design engineer of the firm, succeeding Charles D. Lilburn, who has been named design consultant.

### Willgoos names associate

Capt. Lewis M. Davis, Jr., (CEC, USN, ret.) has been named an associate in the architect-engineer firm of Robert A. Willgoos & Associates of Washington, D. C., and Alexandria, Va. He was formerly senior officer of his corps on the Chief of Naval Operations Staff, as head of the Bureau of Yards and Docks technical planning section.

### AASHO appointments

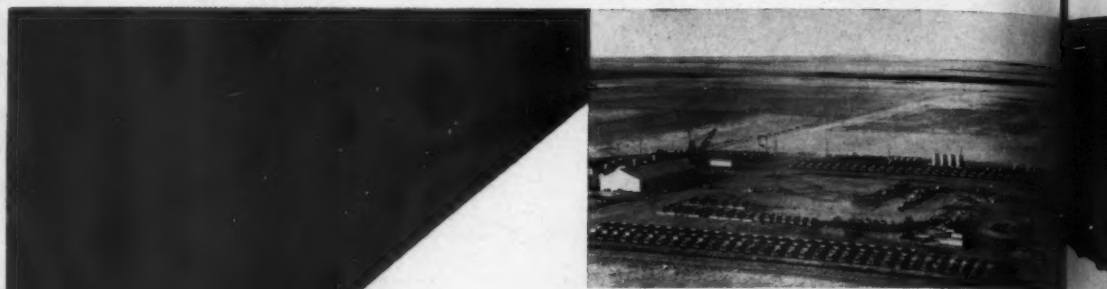
Howard S. Ives, state highway commissioner for the Connecticut State Highway Department, has been appointed to a 4-year term as chairman of the Roadside Development Committee of the American Association of State Highway Officials. Ives succeeds John G. Butler, who resigned from the Iowa State Highway Commission.

W. F. Babcock, director of highways for the North Carolina State Highway Commission, has been named regional vice president for the

Southeast area. He replaces Grotegut, former chairman of Florida State Road Department. Babcock will serve as one of four regional directors for the organization and will also be a member of the National Executive Committee.

### Asphalt Institute news

Alfred W. Maner has joined The Asphalt Institute, College Park, Md., as headquarters staff engineer. He will be responsible for the preparation of technical publications of the



Multi-million dollar picture. Here is part of Western's equipment lined up for inspection at Oahe Dam. Photo shows trucks, 23 bulldozers and crawler pieces and 9 scrapers.

## 2 ways Standard Oil helps Western Contracting Corporation save on Oahe Dam job

*In eight years on project, 10 million gallons of diesel fuel and gasoline have been delivered on time and when needed*

Saving No. 1 F. L. "Red" Napple, Standard Oil staff engineer, and Standard Oil agent Bob Friman have been serving Western on the Oahe Dam project since the first dirt was moved in 1952. This means continuity of service that can be invaluable to a contractor. Red Napple has an engineering degree plus more than 13 years experience in just this kind of work. Western thus has the equivalent of another engineer helping them. Napple is located at Aberdeen, Md., and Friman at Pierre, both only a few miles from the job. Western works around the clock for Standard. Bob Friman and his men make deliveries 24 hours a day, winter and summer. Western never has equipment down while waiting for deliveries of fuels, lubricants or greases.

Saving No. 2 Western uses only quality products—Standard's Diesel Fuel, STANDARD RED OIL.





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stitute and will also act as techni-  
cal-writing coordinator for manu-  
script revisions between institute  
headquarters and the field staff.  
He was previously assistant man-  
ager and tests engineer for the  
Virginia Department of Highways.

## Engineers, Inc., news

Anthony Mauriello has joined En-  
gineers, Inc., Newark, N. J., as engi-  
neering administrator. In this newly  
created post, he will be responsible  
for over-all project scheduling and  
coordination.

## Pennsylvania Highways names regional engineers

Three regional engineers have been  
appointed by the Pennsylvania De-  
partment of Highways for closer su-  
pervision of construction and main-  
tenance activities in the field. The  
newly created posts are filled by  
Leonard J. Curran, the western re-  
gion; Walter Fries, the central re-  
gion; and Raymond F. Campbell, the  
eastern region.

At the same time, Robert Klucher  
replaces Curran as district engineer  
at Pittsburgh; James C. Whalen suc-

ceeds Klucher as district engineer at  
Harrisburg; and Frank Hollister has  
been named special assistant to the  
secretary of the department, and  
will take over some of the duties per-  
formed by Campbell.

## Engineering firm names

Carl Thaller has been named an  
associate of Samborn, Steketee &  
Associates, Otis & Evans, consulting  
engineers and architects with head-  
quarters in Toledo. He is in charge of  
the firm's mechanical-engineering  
department.

Hugh McLaren, Jr.,  
assistant to the  
president of Ver-  
milya-Brown Co.



## Vermilya-Brown names

Hugh McLaren, Jr., has been ap-  
pointed assistant to Charles A. Selby,  
president of Vermilya-Brown Co.,  
Inc., New York City. He was formerly  
project manager for the new engi-  
neering building of The Cooper Un-  
ion, also in New York City.

## Austin elects director; names a vice president

A vice president and two new dis-  
trict managers have been appointed  
and a director has been elected by  
The Austin Co., engineers and build-  
ers of Cleveland.

John N. Beckley, vice president  
and Eastern district manager, has  
been elected to the board of directors.

Rollin R. Eiber has been named a  
vice president. He continues as man-  
ager for the firm's 17-state Midwest  
district.

E. W. Hollister is now manager of  
the 12-state Cleveland district, and  
Charles R. Wing is Southwest district  
manager with offices in Houston.

Donald W. Dar-  
nell, president of  
the National Con-  
structors Associa-  
tion.



## NCA elects president

Donald W. Darnell has been elect-  
ed president of the National Con-  
structors Association, an organiza-  
tion of major engineering and build-  
ing firms engaged in the design and  
construction of industrial facilities.

Robert L. Cashen has been elected  
vice president. New members of the  
executive committee are H. E. Lore,  
George R. Collins, and A. E. Somer-  
ville. Chairman of the labor commit-  
tee is Joseph Hand, and B. O. Yeldell  
is vice chairman.

## Hoist group elects

Herbert W. Gledhill, Jr., has been  
elected president of the Hoist Manu-  
facturers Association, Inc. He is vice  
president and general sales manager  
of Shepard Niles Crane & Hoist Corp.,  
Montour Falls, N. Y.

The new roster of officers includes  
Fred E. Rau, vice president; and  
Weldon C. Miles, Raymond A. Davies,  
and Edward J. Byrne, directors.

Joe H. Peritz has been re-elected  
executive secretary and treasurer, and  
C. M. Dinkins, general counsel.

The elections were held last month  
at the association's annual conven-  
tion in Cleveland.

—For more facts, circle No. 309

Standard Oil Company, STANOLUBE Motor Oils, Amoco Lith-  
-gent Bob Friman, Red Nipple of Standard and West-  
on the Oahe Dam job knows he  
was moved under the supervision of Red Nipple's staff engineer,  
service that gives top level performance over a  
d Nipple's staff engineer, who has been working with contrac-  
than 13 years on the job for each of these men—Bob Friman, Red  
work. Western Nipple's staff engineer, who has been working with contrac-  
ther engine- ing of equipment is needed. Less equip-  
Aberdeen for handling fuels, lubricants and greases  
w miles from the clock is receiving on the Oahe Dam job knows he  
his men making savings on the job. You can get such  
and summer while waiting for greases. Call the Standard Oil office near your  
ity products. Or write Standard Oil Company  
d Red Clay, 310 S. Michigan Ave., Chicago 90, Illinois.

**STANDARD**

You expect more from **STANDARD**  
and you get it!





The cement-treated base for more than four miles of the Olympia Freeway system in Washington is supplied by this plant. A

GM 350-kw diesel power plant in the trailer powers all units of this plant and also serves the hot-mix plant on the job.

## Power unit serves two paving plants

The same tractor shovels, trucks, and rollers are used in work with cement-treated base and hot-mix material.

by RALPH MONSON, field editor



A Michigan 175A places washed gravel and blend sand in plant bins. Syntron feeders deliver proportioned volumes to a Barber-Greene conveyor, which gets 4½ per cent cement from the auger conveyor of the cement silo.



The Barber-Greene pugmill, with a capacity of about 500 tons per hour, works at 450 tons hourly. The radiator of the power plant can be seen through the doors of the van. A cement tanker unloads at the 400-barrel silo.

Using some of the same equipment and the same crews with two separate plants cut down the overhead and increased over-all efficiency on a Washington highway-surfacing project. Careful planning enabled the crews to alternate between the cement-treated base and the bituminous surface courses, using the same power generator, tractor shovels, trucks, and rollers for both operations.

The portable GM 350-kw diesel generating unit and two Michigan tractor shovels first served the Barber-Greene CTB plant, which turned out a mixture of gravel, blend sand, cement, and water for the 6-inch base course. When the job was ready for bituminous surfacing, these same units worked with the big Standard plant to produce asphaltic concrete for the leveling and surface courses.

At the CTB plant, the tractor shovels loaded gravel and blend sand into bins from which calibrated Syntron feeders delivered measured volumes to a Barber-Greene 30-inch belt conveyor. As the conveyor passed a 400-barrel cement silo, supplied by Spokane Machinery Co., Inc., a measured volume of cement was placed on the belt by an auger conveyor. These materials went to the Barber-Greene continuous pugmill mixer, where the optimum amount of water was added as the materials were mixed. This plant produced as much as 500 tph but usually worked at 450 tph.

Within one hour, the big generator and the tractor shovels could be at work with the hot-mix plant. Here again the tractor shovels charged bins equipped with Syntron feeders, and a conveyor delivered the materials to the plant dryer. This special 108-inch dryer was built by Washing-

ton Machinery Co., Seattle. It was fitted with a Hopkins Volcanic burner using heavy fuel oil. A Hopkins oil heater heated the asphalt-storage tanks and the asphalt-handling unit of the plant. The materials were proportioned and mixed in the Standard 4,000-pound batch plant. The entire plant was electrically operated from power supplied by the portable generator.

These operations were conducted by Pacific Sand & Gravel Co., Central Washington, working as a subcontractor for Fiorito Bros., Seattle, which held a \$1.8 million prime contract with the Washington Department of Highways. The project included the leveling, base, and paving of more than four miles of divided highway and work on five bridges. The project was a part of the Olympia Freeway system that extends west and north on U. S. 410 and U. S. 101.

Work for Pacific Sand & Gravel Co. was supervised by a staff headed by superintendent Cliff Larson, including plant foreman Art Johnston, paving foreman E. A. Miller, and truck foreman Ken Miller. Fiorito's work was supervised by superintendents Ernest Fierillo and Elmer Jones.

The Washington Department of Highways was represented by resident engineer Donald R. Anderson, assistant resident engineer Emil Williams, and paving inspector Ray Anderson. These men report to state engineer J. C. Claypool of the Olympia District and to state construction engineer E. C. Simpson. The department of highways for the state of Washington is W. A. Bugge.

Here's the highway project as seen through the camera lens. . .





Select roadway borrow material for the project is loaded by a Michigan 175A tractor shovel into a Peerless bottom-dump trailer for the haul to the work site. This unscreened granular material, taken directly from the pit, is kept stockpiled by a tractor-dozzer.



On the grade, a Ford truck and Omaha Standard trailer, another of the haul combinations used, spread the SRB in thin courses. Total depth ranges from 3 to 12 inches, depending on the nature of the subsoil. An International-Peerless team works, background.



After motor graders have straightened up the courses, compaction is handled by two Bros self-propelled 9-wheel rollers. In places where roadway borrow had to be more than 3 inches deep, the material was placed and compacted in successive courses.



Eight Ford trucks with Omaha Standard hydraulic dump trailers delivered 14-ton loads of the cement-treated base mix to a Jersey spreader on a Cat DB. The spreader lays a uniform course which compacts to 6 inches.



A Jackson compactor follows the Jersey spreader, giving the cement-treated base its initial compaction. The six 2-foot-wide vibrating shoes of the unit cover a 12-foot-wide lane in one pass. Powered by the generator on the rear, the vibrator units are reversible.



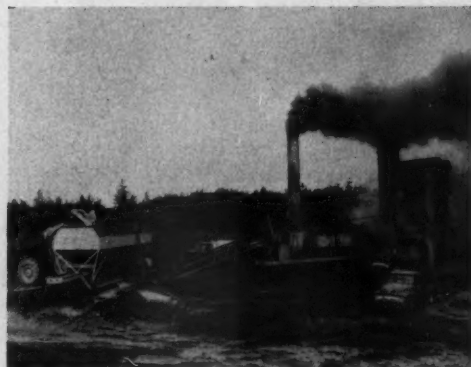
The Jersey spreader lays about 1,000 feet of one lane, then comes back to lay the next. The Jackson compactor, background, makes the first pass. The Cat grader trues up the surface before compaction by the Buffalo-Springfield 10-ton tandem.



The surface of the compacted cement-treated base course is kept moist until the seal coat is applied. This Ford dump truck, carrying a 2,000-gallon water tank, covers the surface with a fine spray. The spraybar has standard lawn-sprinkler nozzles.



As soon as practical, the CTB surface is sealed with SS-1 emulsified asphalt by a Rosco 1,200-gallon distributor on a Dodge truck. The SS-1 is diluted with 50 per cent water and warmed in the distributor before 0.15 to 0.25 gallon is applied per square yard.



Asphaltic concrete for leveling and surfacing courses is mixed in this Standard 4,000-pound batch plant. A Michigan tractor shovel is feeding the triple bins at left. Syntron feeders proportion the aggregates to the conveyor that feeds the 9-foot-diameter dryer.



The Ford trucks and Omaha Standard trailers that hauled the cement-treated base also deliver the hot mix to a Barber-Greene laydown machine. The 1½-inch courses of leveling and surfacing mix are similar except that mineral filler is added to the surfacing.



These rigs share compaction of the paving. The first pass is made by the Galion 7-ton tandem roller in the distance. The second pass is made by the Bros 9-wheel self-propelled roller before a final pass is applied by an 8 to 10-ton tandem.



All of the equipment gets daily servicing from the Graco Convoy Luber. Here, the serviceman lubricates an International truck and Utility tank trailer that delivers asphalt to the plant. Mobile fuel and lubricants are supplied by General Petroleum Corp.



At the construction site of a new sewage pumping station near Toronto, Canada, four Flygt electric submersible pumps dewatered an 80-foot-square area in four days. Pumping costs saved by this method of dewatering were estimated at 65 per cent.



## Pumping cuts dewatering costs on sewage station

■ When Leaside, a suburb of Toronto, Canada, decided to increase its sewage-treatment facilities, the contractor ran into two big problems: the danger of river floods, and a ground water table only 3 feet below the surface. Plans for the pumping station called for a 12-foot foundation with an extra 3 feet for a sump.

Ruliff Grass Construction Co. Ltd. brought in four 3-inch electric submersible Flygt pumps and one 1½-inch Flygt pump. A 15-foot-deep hole was dug near a corner of the proposed building. Since the ground was flowing sand that tended to cave

in, the digging was interrupted twice—at 6 and 12-foot depths—and a 3-inch pump was placed in the bottom of the hole inside a perforated barrel.

After four days' pumping, the area was dry enough for excavation to begin. As work progressed, three more pumps were installed, one at each corner of the building. A wooden crib was built around each pump and barrel to prevent cave-ins. The area became so dry that the walls could be cut and the wells did not need support.

A trench was dug around the foundation, and weeping tile was installed to catch the seepage and prevent it from building up under the construction area. Occasionally, a 1½-inch pump was used in the center area as a "mop." Two days after the four 3-inch pumps were in place, the firm was removed and the rest were left to hold the water level down.

At the center of the excavation, 3 feet above the level of the pumps and 30 feet away, the area was dry. It was estimated that at least 65 per cent of the pumping cost was saved by this method of dewatering.

## Traffic on freeways topic of HRB bulletin

■ The Highway Research Board's Bulletin 235, "Traffic Behavior on Freeways," contains four papers. The first, on the effect of freeway medians on traffic behavior, describes the results of full-scale traffic-behavior studies conducted on freeways in Texas. A report on traffic behavior on an urban expressway outlines the techniques and results of a camera study on the John C. Lodge Expressway in Detroit.

A paper on traffic behavior and on-ramp design contains a full-scale study on a California freeway ramp and suggests a tentative ramp-terminal design standard. A study of freeway traffic operation gives the results of volume control, weaving, and entrance-ramp studies conducted on freeways in Houston and Dallas.

Priced at \$2.40, the bulletin is available from the HRB, 2101 Constitution Ave., Washington 25, D. C.

## A-C magazine relates engineering achievements

■ Its achievements of the past year are reviewed by Allis-Chalmers Mfg. Co. in the new edition of "Engineering in Action," released by the firm's Industries Division. The illustrated 36-page magazine describes advances in equipment research and engineering for the generation, transmission, and distribution of power, as well as an extensive variety of equipment that utilizes power. The latest research findings, including fuel-cell advances and atomic-energy projects in fission and fusion, are reported.

The magazine is available as Bulletin 25R9529 from the company headquarters in Milwaukee.

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# Convention Calendar

**April 18 Producers Council, Inc.**  
Meeting, Mark Hopkins Hotel, San Francisco, Calif. John L. Haynes, managing director, PCI, 2029 K St. N. W., Washington 6, D. C.

**April 18-21 Purdue Road School**  
School, Purdue Memorial Center, Purdue University, Lafayette, Ind. J. F. McLaughlin, associate professor of civil engineering, School of Civil Engineering, Purdue University, Lafayette, Ind.

**April 25-27 Construction Specifications Institute**  
Fourth Annual Convention and Exhibition, Rickey's Studio Inn, Palo Alto, Calif. Warren B. Richardson, general chairman, CSI, 632 Dupont Circle Bldg., Washington 6, D. C.

**April 25-29 American Welding Society**  
Forty-first Annual Convention and Welding Exposition, Biltmore Hotel and Great Western Exhibit Center, Los Angeles, Calif. Information Center, AWS, 33 W. 39th St., New York 18, N. Y.

**April 28-30 Texas Aggregates Assn. and Texas Ready Mix Concrete Assn.**  
Meeting, Hilton Hotel, El Paso, Texas. Ray L. Cain, executive secretary, TAA-TEMCA, 201 Perry Brooks Bldg., Austin, Texas.

**April 30-May 3 Canadian Association of Equipment Distributors**  
Annual Meeting, the Reine Elizabeth hotel, Montreal, Quebec, Canada. M. S. Greene, chairman of the convention publicity committee, CAED, Room 309, Journal Bldg., 247 Queen St., Ottawa, Canada.

**May 6 Conference for Engineers and Architects**  
Annual Conference, Mershon Auditorium, Ohio State University, Columbus, Ohio. Marion L. Smith, associate dean, College of Engineering, The Ohio State University, 140 W. 18th Ave., Columbus 10, Ohio.

**May 10-12 Highway Transportation Congress**  
Eighth Congress, Mayflower Hotel, Washington, D. C. Arthur C. Butler, director, National Highway Users Conference, HTC, 966 National Press Bldg., Washington 4, D. C.

**May 19-20 Society of American Military Engineers**  
Annual Convention, Mayflower Hotel, Washington, D. C. Col. F. H. Kohlss, executive secretary, SAME, 808 Mills Bldg., Washington 6, D. C.

**May 19-29 International Public Works and Building Equipment Exhibition**  
Second International Exhibition, Aeronautical Palace at Le Bourget Airport, Paris, France. Exhibition Secretariat, IPWBE, 1, Avenue Niel, Paris XVII, France.

**May 20-29 Pan American Highway Congress**  
Eighth Congress, Ministry of Public Works, Bogota, Colombia. Ing. Hernando Reyes Nieto, secretary general, PAHC, Ministerio de Obras Publicas, Bogota, Colombia.

**May 23-26 Design Engineering Show and Conference**  
Conference and Show, Coliseum, New York, N. Y. Banner & Greif, 369 Lexington Ave., New York 17, N. Y.

**May 24-27 National Rivers and Harbors Congress**  
Meeting, Mayflower Hotel, Washington, D. C. William H. Webb, executive vice president, NRHC, 1028 Connecticut Ave. N.W., Washington 6, D. C.

**May 30-31 Wire Reinforcement Institute**  
Annual Spring Meeting, The Greenbrier Hotel, White Sulphur Springs, W. Va. Frank B. Brown, managing director, WRI, 1049 National Press Bldg., Washington 4, D. C.

**May 30-June 4 Concrete Reinforcing Steel Institute**

Meeting, The Greenbrier Hotel, White Sulphur Springs, W. Va. H. C. Delsell, managing director, CRSI, 38 S. Dearborn St., Chicago 3, Ill.

**June 8-11 National Society of Professional Engineers**

Annual Meeting, Statler Hotel, Boston, Mass. Charles Ritchie, NSPE, 2029 K St. N.W., Washington 6, D. C.

**June 13-14 National Limestone Institute, Inc.**

Board Meeting, Edgewater Beach Hotel, Chicago, Ill. Robert M. Koch, NLII, 1015 12th St. N.W., Washington, D. C.

**June 13-24 Fundamentals of Welding Engineering**

Summer Conference Course, Ohio State University, Columbus, Ohio. W. L. Green,

Department of Welding Engineering, Ohio State University, 128-A Industrial Engineering Bldg., 190 W. 19th Ave., Columbus 10, Ohio.

**June 19-24 Western Association of State Highway Officials**

Meeting, Multnomah Hotel, Portland, Ore. W. C. Williams, chief engineer, Oregon State Highway Commission, Salem, Ore.

**June 20-25 American Society of Civil Engineers**

Reno Convention, Mapes, Riverside, and Holliday Hotels, Reno, Nev. W. H. Wisely, executive secretary, ASCE, 33 W. 39th St., New York 18, N. Y.

**June 22-23 The Asphalt Institute**

Midyear Business Meeting, Glacier Park Lodge, Glacier Park, Mont. TAI, University of Maryland, College Park.

**June 24-July 1 American Society for Testing Materials**

Annual Meeting and Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. F. F. Van Atta, assistant secretary, ASTM, 1916 Race St., Philadelphia 3, Pa.

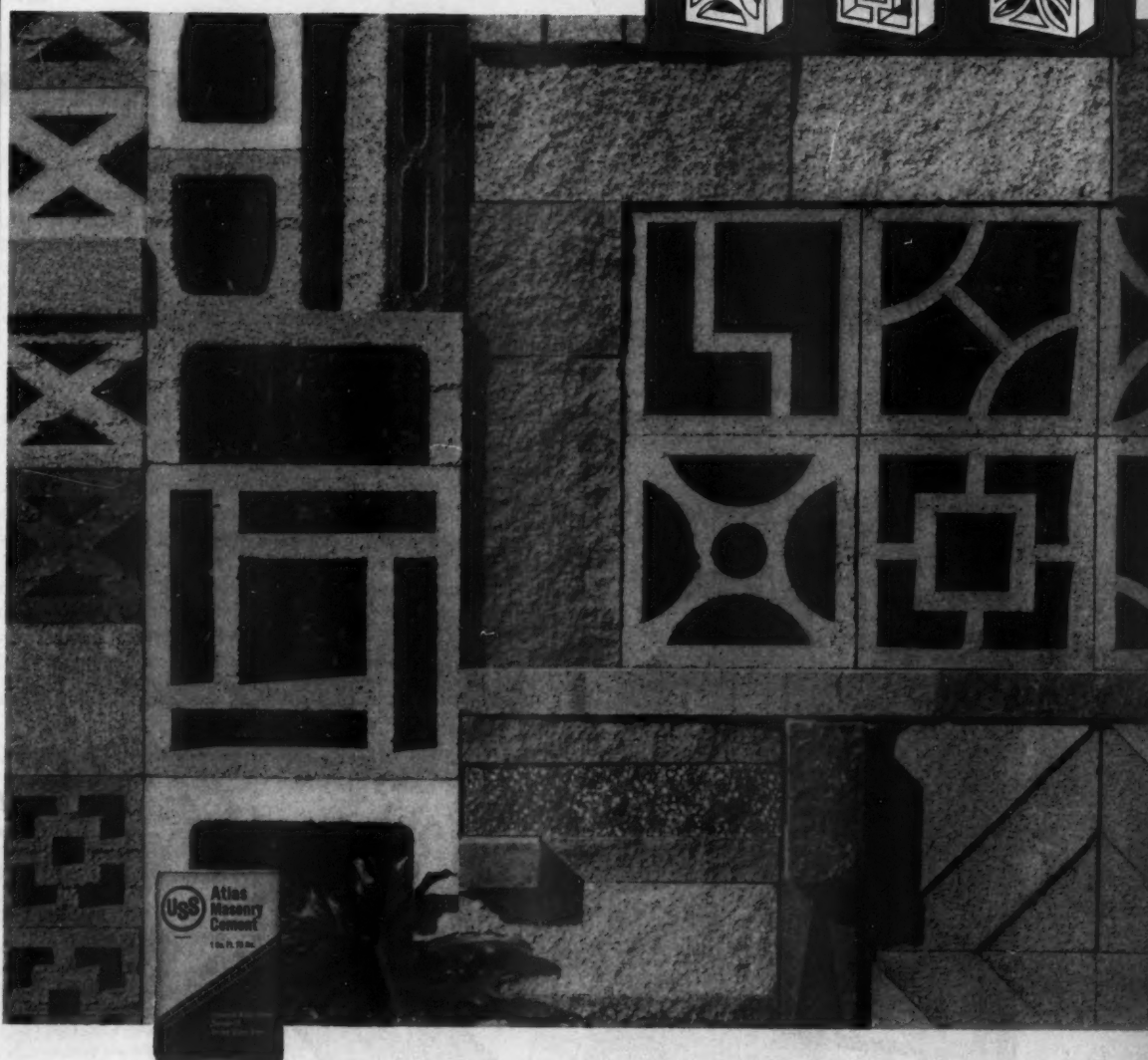
**June 27-29 American Society of Landscape Architects**

Sixty-first Annual Meeting, Waldorf-Astoria, Hotel, New York City, N. Y. Wolcott E. Andrews, general chairman, ASLA, 238 E. 68th St., New York 21, N. Y.

**June 27-29 School for Highway Superintendents**

School, Cornell University, Ithaca, N. Y. J. W. Spencer, highway research and extension engineer, Riley-Robb Hall, Cornell University, Ithaca, N. Y.

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Prestressed-concrete roof channels are being placed first, and beams and columns formed afterward, for the exhibit hall adjoining the Memorial Coliseum at Portland, Ore. This 30-foot-long falsework bent is lifted into place between two column forms by a Link-Belt crane. Bents are of 4x4 posts at 30-inch centers braced by 2x4's.

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**Beams and columns are cast after prestressed roof is placed for**

## Watertight parking deck

Placing the prestressed, precast-concrete roof sections first and then casting the beams to support them was the unique sequence of operations on the construction of the exhibit-hall portion of the new Memorial Coliseum at Portland, Ore.

The heavy channel-shaped prestressed-concrete sections that make up the roof deck were cast in a plant, trucked to the building site, and set in place on the falsework, which also supported the forms for the supporting beams and columns. When the concrete beams and columns were cast, they tied the entire 135x389-foot roof into a continuous unit. This is expected to minimize cracking and eliminate roof leaks.

The exhibit hall, which lies to the

east of the main coliseum, has a floor at the same grade as the arena floor. Because of the sloping site, the east side of the hall is some 15 feet below grade. The designers, Skidmore, Owings & Merrill, have made the most of this sloping topography by incorporating the exhibit-hall roof into the parking area.

Since it will have to take heavy wheel loads, the exhibit-hall roof was designed—like a highway bridge—for H20S16 loading. With the columns spaced at 30-foot centers, this loading required unusually heavy precast roof members.

The units being used are inverted channel sections 29 feet long, 30 inches wide, and 17 to 21 inches deep. They have 3-inch-thick top slabs and

legs that widen from 5 to 7 inches. Diaphragms at the ends and at the third points provide stiffening, but these same diaphragms also created a problem in casting the channels.

The channels are reinforced by three or four 7/16-inch Roebling prestressing strands in each leg. These are pretensioned. In addition, there is conventional welded-wire-fabric reinforcing in the top slabs, and conventional hooked bars project from the ends into the supporting beams. Most of these channels weigh about 9,000 pounds each.

### Special forms for channels

Hoffman Construction Co., Portland, is the general contractor for the coliseum. (See "Crews Work Fast



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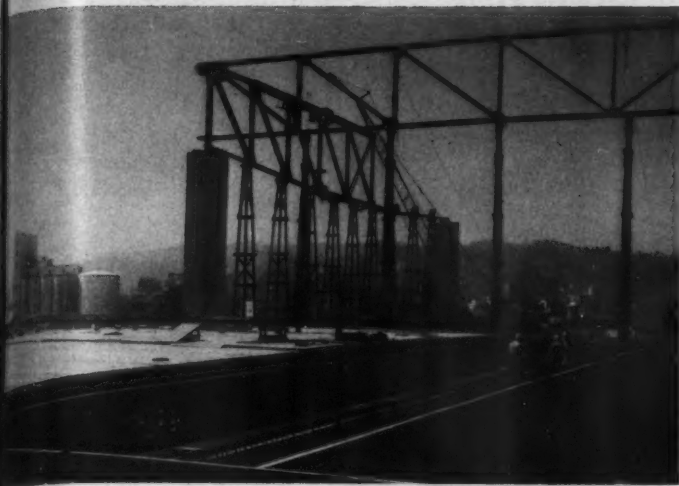
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CONTRACTORS AND ENGINEERS





A row of shoring bents is in place, ready to receive the prestressed channels. After they are set, the beam will be poured around the ends of the channels. At left, roof channels have been placed.

to Get New Arena Under Roof," page 64.) Empire Building Materials Co., Portland, took the subcontract for producing the more than 700 precast, prestressed channel sections. Empire's plant had a usable pretensioning bed and other necessary equipment, but the design of the forms for this new channel section introduced some new problems.

Since the prestressing steel was to be pretensioned in the casting bed, there would be a shortening of each channel when the strands were cut and the compressive strength was applied to the concrete. This shortening meant a displacement of the diaphragms from the position in which they were cast to their position after the pretensioning jacks were released. Either the diaphragm forms had to move with this compression of the beams, or they would have to be removed before the wires were cut.

Empire engineers chose the latter method and designed a form in which the center pans that form the under-

side of the channels and the diaphragms are on an eccentric so that they can be lowered out of the way before the pretensioning stress is released. These forms were fabricated in a local sheet-metal shop.

Four sets of forms were built so that four channels could be cast end to end on the bed at one time. Since the channels were of two depths, the beds were arranged so that they could be raised or lowered to keep the strands running straight through in all cases. When a leg required a fourth strand, it was tied down to a special intermediate anchor and then stressed by the same jacks that stressed the other strands.

#### Produce four per day

With a crew of just four men, Empire produced four of the channels per day from the four forms. Starting early in the morning, the crew first removed the channels cast the day before, using a Link-Belt crane

(Continued on next page)

## NEW-BURCH Dump Body Mounted SPREADER



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Spreads full width or half width on either side.

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- Sealed automotive type reduction gear operates spinner.
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- Roller or ball bearings throughout.
- Hopper supported by heavy structural channel sills and has a sturdy sectional top screen.

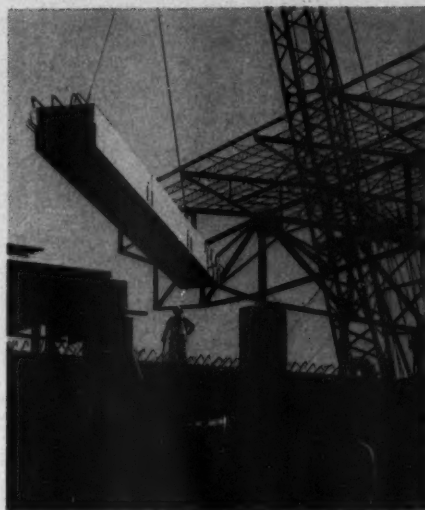
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APRIL, 1960

A 29-foot prestressed channel section is swung into place on the falsework by a crane. Each channel has three or four 7/16-inch strands in each leg and has welded-wire-fabric reinforcing in the top slab. A complete bay of channels stretches across the 135-foot width of the roof.



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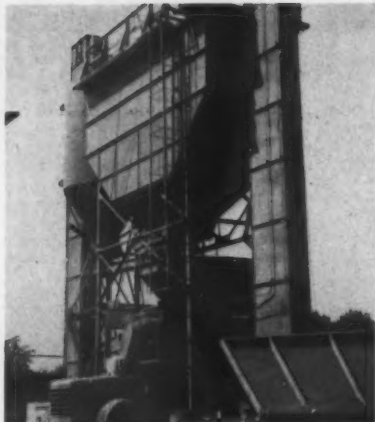


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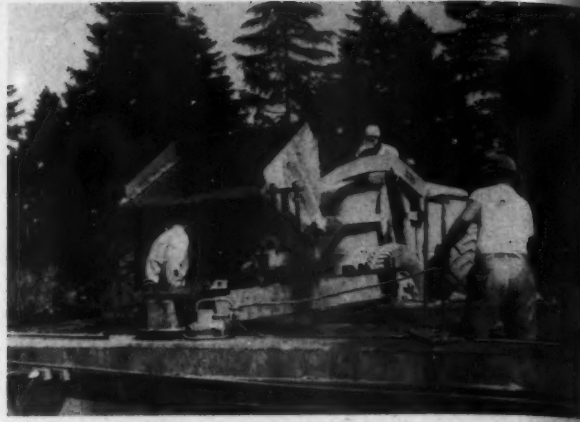




This portable electric-powered hydraulic pump powers the jacks that apply tension to the 7/16-inch Roebling prestressing cables in each leg of a channel for the exhibit-hall roof.



A Hough Payloader with special bucket picks up a load of mix at the plant. There are 20-yard hoppers for sand and gravel, a 10-yard hopper for lightweight aggregate.



Concrete is delivered from plant to forms by the Payloader. Workmen use a small Viber vibrator to work the mix down into the legs of a channel, then finish the top surface with floats. A crew of four produces four channels per day.



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(Continued from preceding page)

to pick them up and place them in stockpiles.

The steel forms were then cleaned, oiled, adjusted, and re-set for the four channels to be produced that day. The prestressing strands were threaded through, attached to the anchor at one end, and stressed with the electric-powered hydraulic jacks at the other end. Conventional reinforcing and bulkheads were set, completing the morning's work. Immediately after an early lunch, the casting began.

A concrete plant built by Columbia Machine Co., Portland, weighed out the batches. This plant has 20-yard sand and gravel hoppers and a 10-yard bin for lightweight aggregate. Its cement silo holds 140 barrels. The batches were discharged directly into a 1/2-yard Cumflo mixer mounted on the lower platform of the tower.

To transport and place the mix, Empire used a specially converted Hough Payloader. The special 16-foot bucket of the Payloader was modified so that it would hold a full bucket of concrete at ground level. The Payloader picked up its load at the plant, traveled across the yard to the casting bed, and placed the concrete directly into the forms. Workmen used Viber electric vibrators to consolidate the low-slump mix in the forms.

As soon as the channels were poured, the beds were covered with heavy tarpaulins, and live steam was admitted under them for curing. Placement was usually completed before 2 o'clock in the afternoon. By 8 o'clock in the morning, when the men returned to work, the concrete had attained a strength of 4,500 psi, and the channels were removed from the forms to start another cycle of operations.

Seat-support units for the arena seating section of the new coliseum were also precast in Empire's plant. These sections were produced in another bed and were not prestressed.

On the building site, the general contractor concentrated most of his manpower on the exhibit hall during the time the steel subcontractor was erecting the structural steel roof of the main arena building. The high retaining wall was built along the

**CONTRACTORS AND ENGINEERS**



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ENGINEERS



Ready-mix concrete is delivered to wall forms by this Link-Belt HC-90 with Gar-Bro bucket. In the background, crews are erecting the tertiary truss system that forms the roof of the coliseum.

In this section of the structure, 4x4 wood shores and Acrow steel shores support Beatty Pecco horizontal shores that hold up the floor forms.



east side of the exhibit hall, and the coliseum column footings were dug and cast.

Forms for the 15-foot-high retaining walls were built up in large panels that were placed, stripped, and reset by crane. These panels were faced with U. S. Plywood's 3/4-inch Permaply backed by 2x4 studs and wales and tied with Universal snap ties. Two Link-Belt truck cranes handled the big form panels and also placed the concrete with Gar-Bro buckets.

The 2-foot-square column forms were fabricated of 3/4-inch Permaply backed with vertical 2x4 studs and tied with Signode steel strapping. These forms were fabricated on benches on the ground and were then set in place over the reinforcing steel cage by one of the Link-Belt cranes.

Heavy shoring units were prefabricated in 30-foot-long units to stand between the columns in the east-west direction. These shoring bents consisted of two rows of 4x4 legs at 30-inch centers cross braced in both directions with 2x4's. Along the top of the legs was a 4x4 ledger to carry the precast channels.

Another pair of ledgers lower down on the legs supported the 2x10 joists for the beam bottom, which was made up of 2-inch lumber faced with 1/4-inch plywood. These supporting beams were inverted tee-shaped girders 36 inches deep and 34 inches wide at the bottom, stepping into a 24-inch stem between the ends of the precast channels.

When the shoring units were in place and the beam bottoms built, the prestressed, precast channel sections were placed by the cranes. A complete bay of the channels, reaching 135 feet across the building, was tied together by pairs of Roebbling 7/16-inch prestressing strands run through sleeves in the diaphragms and post-tensioned after the channels were all in place. The joints between the channels were grouted with a plaster pump.

The final step in roof decking was the casting of the beams. The concrete was delivered in transit mixers, transferred to a Gar-Bro double hopper, and bugged to the forms on the precast channels.

To complete the deck for parking purposes, a membrane waterproofing was placed over the slabs, and the surface was paved with bituminous concrete.

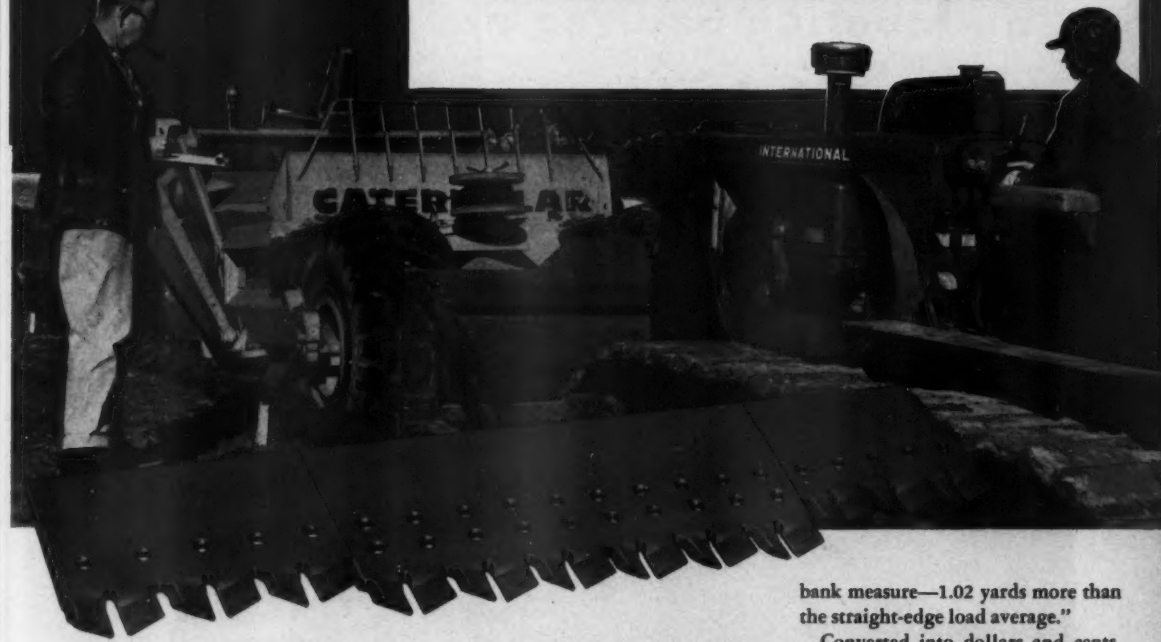
The job superintendent for Hoffman Construction Co. on the project is Ross R. Vickers. The construction inspector representing the architect and owner is Kelly Wellington.

THE END

For more facts, circle No. 317-

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first test a standard-edge scraper blade was used; in the second, the standard-edge was replaced by a Shunk Twistooth Blade. To determine the volume of earth excavated, pits were cross-sectioned before and after each test.

Here are highlights of the test results: "Load travel distance averaged 161 feet with the Twistooth Blade and 225 feet with the straight-edge. Furthermore, the Twistooth picked up an average load of 9.02 cu. yds. by

bank measure—1.02 yards more than the straight-edge load average."

Converted into dollars and cents, these figures represent an important profit potential. For example, let's take a scraper on a job averaging about 90 complete cycles in a ten-hour day. With dirt-moving costs between 40 and 50 cents a yard, this means that the Shunk Twistooth Blade, by adding an extra yard to every load, could earn \$36 to \$45 more net profit every day from every scraper on the job!

\*Conducted at The Heavy Equipment Operators School, Engineering Extension Service, Texas A & M College, under the Direction of R. L. Feurifoy, noted engineer-author of Construction Planning, Equipment and Methods and other technical books and articles. Tests are not to be construed as endorsements of manufacturers' products by Texas A & M College.

SUMMARY OF TEST RESULTS		
	Standard Edge	Twistooth Blade
Average load by bank measure . . . . .	8.00 cu. yds.	9.02 cu. yds.
Average load travel distance . . . . .	225 ft.	161 ft.
Average feet of loading per cu. yd. . . . .	28.1 ft.	17.9 ft.

SHUNK MANUFACTURING COMPANY • BUCYRUS, OHIO







## Monthly reports tell the story . . .

**of distributor's cost of doing business  
and reveal any expenses that are out of line**

General offices, parts department, and shop facilities of the company are in this building at 1516 Leavenworth St. in downtown Omaha. Service facilities and the used-equipment area are in an adjoining block. The company plans to move to the outskirts and put the entire business under one roof.

## Top Production

*whatever and wherever  
the job....*



# HENDRIX

## DRAGLINE BUCKETS

*"A Type for Every Digging Purpose..."  
1/4 to 40 Cubic Yards-Perforated or Solid*

**HENDRIX MANUFACTURING COMPANY, Inc.**  
MANSFIELD, LOUISIANA

For more facts, use Request Card at page 18 and circle No. 318



In these days of rising costs and stiffer competition, many dealers are trying to hold onto profits by reducing the cost of doing business.

One Nebraska distributor has taken a step in this direction by developing a simple system of cost accounting. The Nebraska Tractor & Equipment Co. of Omaha has found that in order to reduce the cost of doing business, it first has to know what the business is costing.

To keep track of expenses, the company has set up a system of monthly reports. The reports reveal the income, the costs, and the net profit of each department. The head of each department receives a report on his operation. Top management receives the combined report of all departments.

The system has many advantages. The service manager, for example, can tell at a glance if the past month's work has resulted in a reasonable profit for the company. If the report shows a net loss, he can take a critical look at the itemized list of direct costs. He can see where the money is going and can take steps to correct the situation.

The combined report on all departments is a valuable tool for the distributor. Each month he can measure the success of the business with this inflexible dollars-and-cents yardstick. When profits start to decline, he can get together with department heads and try to remedy the difficulty. With the monthly cost reports, he can often point his finger directly at the place where the money is being lost.

The reports are also a useful tool for testing the results of new company policies. By looking over successive reports, the president or department head can tell if a new policy is beginning to pay off.

### Well established firm

The monthly statements have proved to be a valuable asset to Nebraska Tractor. The company has a good-sized operation covering 72 counties in the eastern half of Nebraska and 8 counties in western Iowa. The 10 salesmen, headed by M. L. Greer, sales manager and vice president, sell equipment primarily for highway and heavy construction. The company maintains a Grand Island branch that is supervised by Robert Reisser, vice president. The

**CONTRACTORS AND ENGINEERS**



## Distributor Doings

company and the branch employ a total of about 75 people.

Responsible for starting the cost-analysis program is the company's new president, Vernon H. Reisser. In January, 1959, Reisser replaced L. G. Druschel as president. It was Druschel who helped organize the company in 1940 and who built it to its present stature. Far from retired, Druschel is busy running a rental and used-equipment business in Omaha.

From the time Nebraska Tractor was organized, 20 years ago, it has sold International Harvester construction equipment. Among other exclusive accounts are Drott Mfg. Corp.; Gallon Iron Works & Mfg. Co.; The Frank G. Hough Co.; Seaman-Gunnison Corp.; Link-Belt Speeder Corp.; and Worthington Corp.

Actually, the monthly cost reports do not place too heavy a burden on the accounting department, which already has the necessary figures. It is just a matter of digging them out each month and putting them in report form.

To simplify the report, the costs to each department are divided into three categories:

1. General and Administrative Overhead. This group is made up of officers' salaries and miscellaneous expenses that cannot be charged to any particular department. Each department bears its share of these expenses according to its monthly volume. The expense is normally a fairly small percentage of the department's total sales or income.

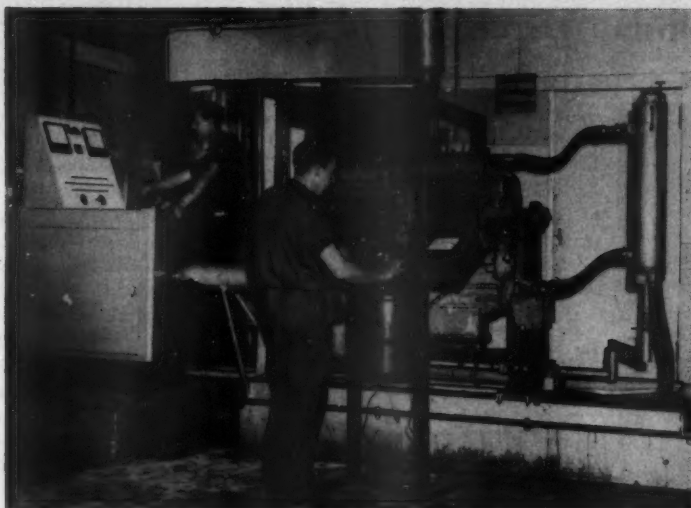
2. Overhead Expense of Department. These are fairly constant expense items that can be charged directly to a department. The 13 items on this list include such charges as depreciation of department equipment, supervisory personnel salaries, maintenance of facilities, lights, power, water, etc.

3. Direct Expense of Department. These expenses vary from month to month and often determine whether or not a department shows a profit. The list of some 31 items includes freight and expenses, outside labor, clerical personnel salaries, personnel expenses, gratis service, and automobile expenses. An expense such as advertising is normally charged directly to the department that it benefits. If it benefits the entire company, the expense is shared by the individual departments.

### The report form

The top figure on the report form gives the total sales (or total goods or service sold) by the department during the previous month. From this figure is subtracted the cost of sales.

(Continued on next page)



Added emphasis is being put on servicing and repair of equipment these days at the Nebraska Tractor & Equipment Co., Omaha. After additional mechanics were hired for the shop, profit figures on the monthly cost reports showed the improved service policy to be financially successful.

## You and UNIT earning power

... a payload partnership



Completely satisfied with the performance record of his two UNIT 3/4 YD. excavators, Mr. James Lavin of JFL Trucking and Excavating, West Allis, Wis., says he'll pick UNIT again when buying a new machine.


Buying major construction equipment is almost like marriage — you'll live with your choice a long time. That's why it's important to choose the bigger *earning power* of a UNIT excavator or crane. You'll find that your equipment investment will pay off with fast cycle speeds, big output and more dependable performance than other machines in the same size range. You and your UNIT will have a true *payload partnership*.

Fast work on the job — lowest operating cost — negligible downtime . . . these are but some of the reasons why the *earning power* of a UNIT lets you knock out the competition at bid letting time. You win more contracts with a combination of job-proved features, finest quality components and unmatched workmanship.

Features like UNIT'S exclusive one-piece cast

main machinery gear case that completely encloses all gears and shafts in a constant bath of lubricant . . . eliminating frequent adjusting or greasing. UNIT offers straight-in-line mounting of the engine with the main machinery to give longer machine life and perfect alignment of all working parts. All disc-type operating clutches are interchangeable . . . can't grab or self-energize. The exclusive automatic traction brakes on crawler machines assure positive, safe braking power . . . even on the steepest grades. Long, wide-spread crawlers and a big, heavy carbody provide the solid working base you need to get full dippers in the toughest material.

You can start on the road to your *payload partnership* right now by calling your UNIT dealer. He's got the detailed information you need on the 5 UNIT convertible crawler machines, 4 UNIT convertible truck cranes and 2 UNIT mobile cranes.

		<b>UNIT CRANE &amp; SHOVEL CORP.</b>	
<b>SHOVELS</b>	<b>HOES</b>	<b>CRANES</b>	<b>DRAGLINES</b>
1/2 to 3/4 YDS.	1/2 to 3/4 YDS.	5 1/2 to 40 TONS	1/2 to 3/4 YDS.
6309 W. Burnham Street Milwaukee 19, Wisconsin			

For more facts, use Request Card at page 18 and circle No. 319



## distributor doings



Vernon H. Reisser, a "shirt-sleeves" president who enjoys getting out in the field, talks up the good points of this International TD-15 with Drott 4-in-1.

(Continued from preceding page)

In the case of the sales department, this represents the distributor's cost of new or used equipment sold and that portion of rentals credited to sales. In the case of the shop, the cost of sales is actually the wages of the men doing the work. By subtracting the cost of sales from the total sales of the department, the gross margin is obtained.

From the gross margin, the three expense categories are deducted. The balance represents the profits (before federal income taxes) of the department. On the form, allocation of the general and administrative overhead and the overhead expense of the department are inserted as totals. There is no individual breakdown of these expenses since they are fairly constant. The department head has little control over them.

The direct expenses, however, are of interest to the department head. These items are individually listed and totaled on the report.

In addition to the dollars-and-cents figures, each major total is given as a percentage of the total sales of the department. For example, direct costs may total \$2,050 or 24 per

cent of total sales. The percentage figure is given because it is useful in comparing one report with another.

### Who receives the report

Each department head at the main office and at the branch office receives a report covering his operation. Sales, parts, shop, and field service are the four departments. A report goes to each of the eight field service men. Each man has his own truck, operates in his own area, and runs a small-scale business almost by himself. He receives a report covering his individual operation.

The president receives a compilation of all the departmental reports. From the reports, he can tell how the over-all business is doing.

Nebraska Tractor & Equipment Co. encourages team effort among all its departments to provide the best service for its customers. Sales and service work closely together; shop and parts complement each other's operations. The parts department is eager to serve the customer accurately and promptly because this is the best way to increase sales of new equipment. The increase in machines being used means an increase in parts volume.

Staff meetings of department heads are held frequently to review the over-all business operation. The enthusiasm of all departments has particularly strengthened the shop and service side of the business. By adding 10 mechanics to the force, shop has been able to provide speedier service. The added sales volume of customer service has more than offset the increasing cost of operation. The result is profit instead of loss in the service department.

How is the firm able to tell if this new service program is paying off? Those monthly cost reports. They tell the story.

THE END

### Dealer changes name

Baxley & Henry Ford Tractor Co. Inc., is the new name for the Northeastern distributor of Ford light industrial tractors and equipment. The firm was previously known as Baxley & Greene, Inc. The name was changed to reflect its present ownership, which consists of Robert V. Baxley, president, and Paul L. Henry, executive vice president and general manager. Dealer headquarters are at 363 Park Ave., East Hartford, Conn. It serves New England and 16 counties in southeastern New York State.

### New L-W distributors

Finch-Bayless Equipment Co., Inc., 1025 S. Mill St., Kansas City, Kan., has been appointed a distributor for the complete line of earthmoving equipment produced by the LeTourneau-Westinghouse Co., Peoria, Ill. The dealer will cover eastern Kansas and western Missouri.

Buckhorn Equipment Co., 521 E. First St., Cheyenne, Wyo., will also handle the complete line of L-W earthmoving equipment. The dealer will cover eastern and southern Wyoming.

# H&L

## Teeth that really dig

FORGED HIGH ALLOY STEEL

PRODUCTS PAY BIG DIVIDENDS

ON EVERY DIGGING JOB

POINTS STAY SHARP

PENETRATE HARDEST

MATERIALS

REPLACEABLE WELDPLATES

ADD GREAT ECONOMY

H&L

### TOOTH COMPANY

1540 SOUTH GREENWOOD AVE. MONTEBELLO, CALIFORNIA

For more facts, use Request Card at page 18 and circle No. 320





Herbert J. Mayer is the new president of AED, replacing the late Jewel Benson.

### Herbert J. Mayer named AED president

Herbert J. Mayer, executive vice president of Western Machinery Co. and general manager of Edward R. Bacon Co., both of San Francisco, Calif., has been named president of the Associated Equipment Distributors, taking the place left vacant after the death of Jewel A. Benson. Benson, who took the oath of office as the 41st president of the association, died on February 19.

Mayer moves up from the post of senior vice president of the association. Richard F. Newlin, Newlin Machinery Corp., Kansas City, Kans., is now senior vice president, moving up from the post of vice president. In a special appointment by the board of directors, John R. Borchert, Borchert-Ingersoll, Inc., St. Paul, Minn., was named a vice president. He is a former AED director in Region VIII, treasurer, and current chairman of the finance committee.

### Griffin head dies

Hugh J. Hush died suddenly last month in Florida. He was president of Griffin Wellpoint Corp. and of Griffin Equipment Corp., New York, N. Y., and Lodi, N. J. Hush was a past president of the AED.

### Mississippi dealer marks 33rd anniversary

The Mississippi Road Supply Co., Jackson, is celebrating its 33rd anniversary. The dealer carries International Harvester industrial tractors, power units, scrapers, dozer shovels, bulldozers and bullgraders, and 2-axle motorized scraper units; Gallion Iron Works & Mfg. Co. motor graders and tandem rollers; Bucyrus-Erie shovels, cranes, and draglines; Hough Payloaders; Quick-way truck shovels, draglines, and cranes; Drott Bulldozer shovels and loaders; Cleveland Trencher backfillers and trenchers; Tampo sheepsfoot and rubber-tire rollers; Bethlehem wire rope; and M-R-S heavy-wheel tractors and Mississippi wagons which Mississippi Road Supply manufactures.

### RCA representatives

Four manufacturer's representatives have been named by Radio Corp. of America, Camden, N. J. Texas Gulf Electronics, Inc., Houston, will operate primarily in that area; Lealie E. Olsen Co., Lewistown, Mont., throughout the entire state. Communications Sales Co., Salisbury, Md., covers the Delaware, Maryland, and Virginia peninsula; and Industrial Communications of Indiana, Indianapolis, serves central Indiana.

### Pacific Mercury names

Construction Signs, Inc., 317 Wall St., Las Vegas, has been named a stocking distributor for flasher warning lights produced by Pacific Mercury Mfg. Corp., Van Nuys, Calif.

### South Bend Division appoints distributor

Brooks Industrial Sales, Inc., Sun Prairie, Wis., has been appointed a distributor for the complete line of construction machinery manufac-

tured by the South Bend Division, Curtiss-Wright Corp., South Bend, Ind. The dealer will cover the entire state of Wisconsin.

### Aikins Tractor move

Aikins Tractor Co., Eureka, Calif., has moved to 959 W. Murray St. The dealer now handles tractors produced by Elmcro Corp., Salt Lake City, in Del Norte, Humboldt, and Mendocino counties in California and in Curry County, Oregon. George Fretland is the firm's new sales manager.

### Le Roi dealer adds line of large compressors

Chesapeake Supply & Equipment Corp. has added the S2 line of large stationary air compressors produced by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee. The firm also distributes Le Roi portable air compressors. Sales and service of the S2 compressors will be handled at Chesapeake's locations at 1211-13 E. 25th St., Baltimore; 4726 Baltimore Ave., Hyattsville, Md.; and Forest St. and Railroad Ave., Dover, Del.

PERFECT CIRCLE PISTON RINGS ARE BUILT TO TAKE IT

# HOTTER THAN A BLOWTORCH

The searing heat that's created inside engine cylinders causes inferior piston rings to lose their strength and resilience, and wear out far before their time. That's why Perfect Circle employs special metallurgical skills to produce ring materials that have the high heat stability needed for long life.

Extra-thick, solid chrome plating adds greater protection against scuffing. And, special alloys and heat treating deliver extra-high heat resistance for critical applications.

Whatever the job, Perfect Circle rings are built to take it. Insist on Perfect Circles—first choice of leading engine manufacturers and mechanics everywhere.

## PERFECT CIRCLE

PISTON RINGS • PRECISION CASTINGS • POWER SERVICE PRODUCTS • SPEEDOSTAT  
HAGERSTOWN, INDIANA • DON MILLS, ONTARIO, CANADA

For more facts, use Request Card at page 18 and circle No. 321





For more facts on Spread on Insert, use coupon or circle No. 323.

A CONTINUOUS NO-ACCIDENT RECORD for Price Bros.-McClung, Inc., Dayton, Ohio, won that firm the U. S. Army's Certificate of Merit for Safety. Marshall L. McClung, president, accepts the award from Col. W. W. Wilson, district engineer, U. S. Army Engineer District, Detroit. The construction firm's winning record dated from June 13, 1957, to December 3, 1959, during which time the company worked on three Army Engineer contracts involving dredging in Monroe Harbor and St. Marys River, Mich.

## WITH A SCHRAMM 125 COMPRESSOR YOU SAVE \$1,685 AT THE START!

### 1 compare

price range  
other make



	Lowest	Highest
price range other make	\$ 4,950	\$ 6,405

Schramm prices....	\$ 4,720	\$ 4,720
--------------------	----------	----------

you save.....	\$ 230	\$ 1,685
---------------	--------	----------

ask for complete savings comparison chart!

### 2 then you get Schramm operating savings



FUEL

save 15-50 %  
every year

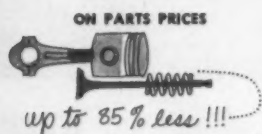
PORTABILITY

most compact job  
on the market

FULL 125 CFM OF AIR

15% more power

### 3 and you get Schramm maintenance savings



ON PARTS PRICES

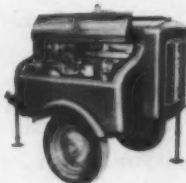
up to 85 % less !!!

ON PARTS HANDLING  
wearing parts 90 %  
interchangeable between  
engine + compressor

#### IN SHORT...

Savings with Schramm piston-type compressors in any size, the day you buy. Then you keep on saving with Schramm's full-rated air delivery, extra power, low maintenance and fair play on parts prices. Check now. Complete line; gas or diesel, with hefty economies in every compressor size.

See your nearest Schramm dealer listed in the Yellow Pages, or write for more facts.



## Schramm AIR COMPRESSORS

762 North Garfield Ave., West Chester, Pa.

Schramm, Inc., manufacturers of Rotadrills (Pneumatoractor Mounted, Truck Mounted, Crawler Mounted), Air Compressors (Portable, Stationary), Self-propelled Air Compressors (Pneumatoractors) and Booster Compressors

### New edition of book on engineering economy

The fourth edition of "Principles of Engineering Economy," by Eugene L. Grant and W. Grant Ireson, gives the basic principles for making such decisions as the acquisition and retirement of capital goods, the choice between alternative methods of financing, and income-tax considerations of investment proposals. Two fundamental points are stressed: that only prospective differences between alternatives are relevant, and that a proposed investment should provide a financial return commensurate with the returns obtainable from other

opportunities for investment of limited funds.

New features include practical reasons for avoiding unsound criteria in evaluating investment proposals; continuous stress on use of the "discounted cash flow" theory; strengthened presentation of basic principles; and thorough coverage of the impact on economy studies of the various depreciation methods authorized under recent U. S. tax laws.

The \$8 book may be purchased from The Ronald Press Co., 15 E. 26th St., New York 10, N. Y.

### Booker to help plan Argentine public-works program

R. W. Booker & Associates, consulting engineering firm of St. Louis, has contracted with the Province of Mendoza, Argentina, for an extensive study of technical, economic, and financial aspects of a public-works program contemplated by the province. Associated with the Booker organization as a joint venture are Tellepsen

Construction Co., Houston, and Smith, Hinchman, & Grylls Associates, Inc., Detroit.

The joint venture will develop a plan and make recommendations for the construction of dams, hydroelectric power plants, electric power transmission lines, irrigation systems, roads and bridges, etc.

## 15,000 Patterns

ON HAND FOR GRAY AND DUCTILE IRON

## Construction Castings

WITH LARGE STOCKS MAINTAINED FOR  
PROMPT SHIPMENT ANYWHERE



Send for free 168-page catalog.

NEENAH FOUNDRY COMPANY  
Neenah, Wisconsin

Chicago Office: 5445 North Nava Avenue, Chicago 31, Illinois

For more facts, use Request Card at page 18 and circle No. 322.

For more facts, use Request Card at page 18 and circle No. 323.

CONTRACTORS AND ENGINEERS



# “No corrosion, negligible maintenance and continued high carrying capacity with Transite Pipe.”

JOHNSON & ANDERSON, INC., CONSULTING ENGINEERS, PONTIAC, MICH.

“First cost and economical operation make Johns-Manville's Transite Pipe a practical long-term investment,” say Messrs. Johnson and Anderson, consulting engineers, pictured at right. “Despite this economy its performance is superior in many ways. There's no corrosion, negligible maintenance and continued high carrying capacity . . . helping through the years to save in the operation of the system. These many economies make it easier for communities to build and expand their water systems.”

Transite's maintained carrying capacity keeps pumping costs low. Its strength, durability and corrosion-resistance cut maintenance—provide years of trouble-free service. Further savings are effected by the sure coupling method that assures a tight seal at every joint. Add to this Transite's natural interior smoothness and you see why it helps reduce community water system costs. Let us send you “Facts and Data for Engineers” book. Write Johns-Manville, Box 14 (CE-4), New York 16, N. Y.



JOHNS-MANVILLE



For more facts, use Request Card at page 18 and circle No. 324





Moves 65,000 yards of dirt a day for jet-age new runway at Nashville

## GULF MAKES THINGS RUN

Nashville, Tennessee is making way for the jet age with a whopping \$6,500,000 airport improvement program. As part of that program, Gregory-Burns-Waters Company, joint venture contractors, are moving 5,000,000 cubic yards of dirt for a new 10,000-ft. runway. And they're moving it at a rate of 65,000 yards a day!

To stay on schedule, each pan must average 95 trips each 10-hour shift, hauling more than 25 cubic yards of dirt per trip. Trip distance—up to 9,000 ft. A battering, gear-grinding pace? Sure. But the contractors know

their equipment, and know how to shave downtime to none of a minimum. They're lubricating every piece of equipment. On your part on the job—between shifts—so that no time is lost in preventive maintenance. And, they're using this combination of Gulf fuels and lubricants that have proved themselves over the years; Gulf diesel fuel, Gulf Super Duty Motor Oil, and Gulflex A lubricant. Before

Says Jim Gregory of Gregory-Burns-Waters Company: "We haven't any time for equipment failure on this job. Of the few maintenance problems we've had, heavy equipment





rough, hilly terrain was gouged, scraped and filled to become a 10,000-ft. runway. It required movement of 5,000,000 cubic yards of dirt. Fourteen pans averaged 95 trips during each 10-hour shift.



Boom! Blasting off rock layers during the leveling process. Gulf Rock Drill Oil kept drills running at peak performance for the task.



Blasted rock being loaded and carted away for fill. Gulf Super Duty Motor Oil kept shovel downtime to a minimum, while clean-burning Gulf diesel fuel and Gulflex A multi-purpose grease kept engines humming and wheels turning to complete the job in record time.



Left to right: Charles (Buddy) Gregory, J. B. Long, Gulf Sales Representative, Isham Gregory, James (Jimmy) Gregory, and Bill Taylor, Gulf Sales Representative. You can always rely on Gulf for on-the-job service.

way at Nashville Airport . . .

# GSRUN BETTER!

downtime none of them have been traced to fuels or lubricants." On your next job, see for yourself how Gulf makes things run better. Phone your nearest Gulf office, and find out how quality fuels and lubricants from a prompt, dependable source of supply can trim down costly mechanical delays.

Before you turn the page, clip and check the coupon at right for a free copy of the 88-page "Gulf Contractors' Guide"—the lubrication and maintenance manual for heavy equipment.



## GULF OIL CORPORATION

Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

Please send copy of "Contractors' Guide."

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

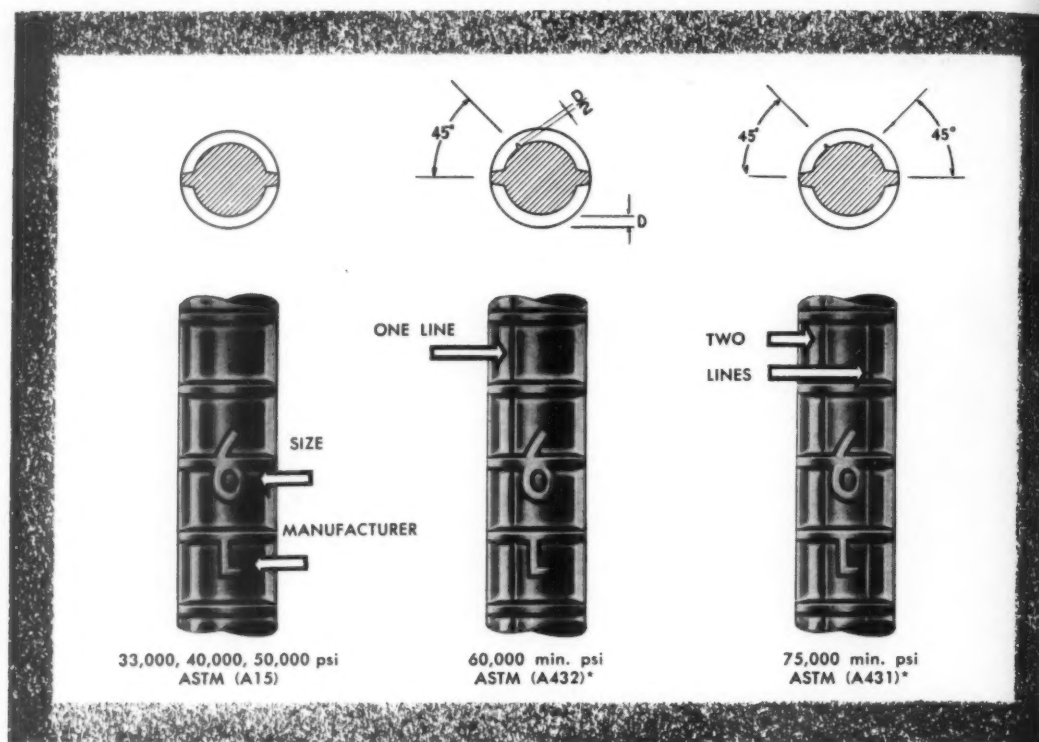
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

SP-9740



# NOW...

## Every LACLEDE Multi-rib Reinforcing Bar is Marked to Show SIZE and STRENGTH...



Standard high strength steels\* permitting greater economy and efficiency in reinforced concrete design under the provisions of the new A.C.I. codes must be identified. Recognizing this need, each Laclede Multi-rib reinforcing bar can now be completely identified as to size, strength and origin through a new rolled-in marking system. This assures the designer, contractor, and code writer that the proper grade of reinforcement is used on the job.

Demand these new time-saving Laclede bars for your next construction job.



### LACLEDE STEEL COMPANY

SAINT LOUIS, MISSOURI

Producers of Steel for Industry and Construction

For more facts, use Request Card at page 18 and circle No. 326



## CSA adopts new crane-rating standards

The Power Crane and Shovel Association has adopted a new and uniform method of rating full-revolving power cranes.

Crawler, truck, and wheel-mounted cranes will be rated on the basis of the maximum load, in tons, at the radius selected by the manufacturer, in accordance with Commercial Standards CS90-58, paragraph 6.06.

The crane rating will be supplemented by a second group of numbers to designate the PCSA classification into which the crane falls. This identification will consist of two numbers: the crane-rating radius, in feet, of the maximum rated load, with base boom length; the rated load—

expressed in pounds divided by 100, and rounded off to the nearest whole number—at 40-foot radius, with 50-foot boom length.

These values are to be based on the crane ratings in the direction of least stability, with outriggers set, if the machine is so equipped.

For example, assume a truck crane is rated, with base boom length, at 40 tons at 12-foot radius, and at 19,600 pounds with a 50-foot boom at 40-foot radius. The classification would then be "40-ton truck crane (PCSA Class 12-196)." The figure "12" comes from the rating radius and the "196" from dividing 19,600 by 100.

## Hertz company enters equipment-leasing field

The Hertz Corp., Chicago, has entered the equipment-leasing field and has formed a wholly owned subsidiary, Hertz Equipment Leasing Corp., for this purpose. The company will emphasize equipment associated with the use and leasing of trucks and cars, such as bulldozers, trailers, etc.

Under the leasing plan, a customer selects the equipment he needs from a supplier of his choice at a price agreed upon between them. Hertz then buys the equipment, which is

delivered directly to the customer, who receives benefit of manufacturer guarantees, warranties, or service policies. Hertz will bill the customer in accordance with the terms of the lease agreement.

A blanket lease is provided whereby equipment is ordered as required and automatically included under the lease. Hertz will also purchase and lease back equipment presently owned by a customer who wishes to convert it into immediate working capital.

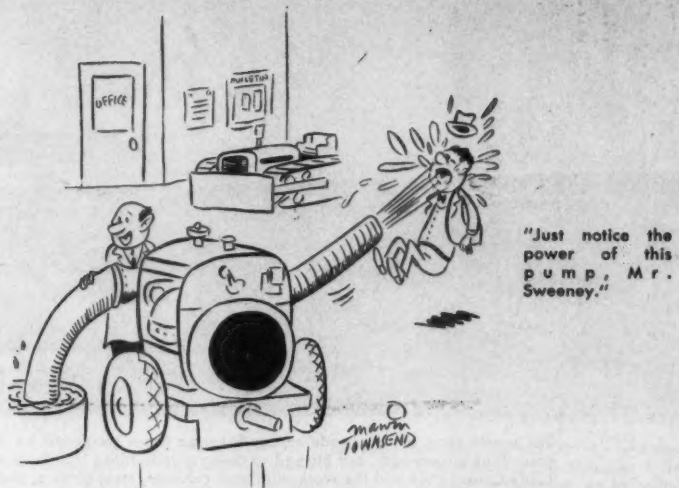
## Ready-mix concrete business is analyzed

"Ready Mixed Concrete," by James A. Nicholson, covers fundamental phases of the business. The book discusses operation fundamentals: planning in the ready-mix industry, factors in planning a plant, operation controls, equipment requirements; and special operation considerations: selecting and handling aggregates, transit vs. central-mix, advantages and disadvantages of nonagitating

delivery equipment.

Also detailed are quality problems and the importance of good practices; dealing with customers; delivery-control problems and others.

Single copies sell for \$5; 5 to 20 copies for \$4 each. A special discount is offered when more than 20 copies are purchased. Publisher of the book is Maclean-Hunter Publishing Corp., 79 W. Monroe St., Chicago 3, Ill.



# VULCAN

"power matched" **Superkut**

Breaks 50% more concrete per man hours than any other tool!



Built-in quality for greater productive power, superior design for heaviest projects and 70 years of tool manufacturing experience make the original Superkut® the leader in the pavement breaking field. Unique wedging action of Superkut® Chisels actually break concrete, rock, asphalt, brick or cobblestone 50% faster.

Superkut® Chisels stay sharp up to 10 times longer, and, tend to resharpen themselves. For jobs too tough for ordinary tools avoid confusion and always ask for the genuine Superkut® Chisel. When you specify Vulcan you buy the original — not a "carbon" copy.

### ALSO SPECIFY VULCAN FOR:

- Pavement Breaking Tools
- Clay Digging Tools
- Drill Steels
- Chipping Hammer Tools
- Electric Hammer Tools
- Hand Tools for Concrete, Stone and Steel Workers



VULCAN TOOLS are sold exclusively thru distributors

## VULCAN TOOL MANUFACTURING COMPANY

41 Liberty Street, Quincy 69, Massachusetts

Specialists in the Design and Production of Pneumatic Tool Accessories

For more facts, use Request Card at page 18 and circle No. 328

## MOTOR TRUCK SCALES that SAVE You Money\*

... PORTABLE ... HEAVY-DUTY ... SELF-CONTAINED ...

CAPACITIES TO 80 TONS



### \*TANDEM CONNECTED UNITS

### \*SPLIT FRAME UNITS

### \*SINGLE UNITS



\*These Portable Scales are designed from the ground up to give you greater operating efficiency at lower cost.

Two types of decks are offered: Heavy Checkered Steel Plate Runway or timber decks. These scales are easily transported with the two steel bulkheads being held in place by two bolts, which are easily removable for transporting. Scales are of all-steel construction, eliminating problem of breakage. Simple design.

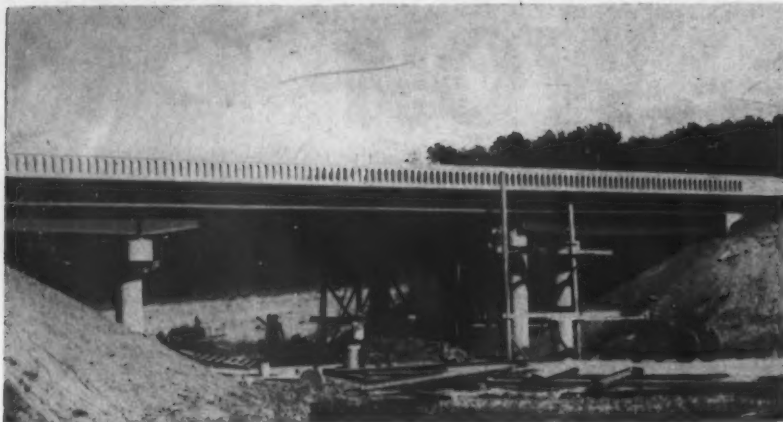


**Cardinal**  
SCALE MFG. CO.  
P. O. Box 151 — Webb City, Mo.

Write Dept. CAE  
For Complete  
Information

For more facts, use Request Card at page 18 and circle No. 327





The center span of this grade separation had to be increased 14 feet for another lane underneath, but instead of doing a rebuilding job, Kansas and J. A. Tobin Construction did the work with new columns, steel girders, and jacks.

## New piers for old

... give new life to a bridge whose center span must be increased 14 feet for new lane

Here's the problem. A grade separation must have its center span increased by 14 feet to make room for an additional traffic lane underneath. Highway traffic must be maintained over the bridge. Construction traffic must be allowed to pass on the lower level.

Sounds impossible, but the Kansas State Highway Commission, with the assistance of J. A. Tobin Construction Co., accomplished the feat with a minimum of the taxpayer's money.

Briefly, here's what they did. The new piers were built seven feet back from the old piers under the 3-span bridge. Steel girders were used to reach out from the new piers to support the deck at the old column line.

Each steel girder acted like a lever. The fulcrum or leverage point was the top of the new pier. Pressure applied at the abutment end of the girder forced the other end upward, relieving the load on the old columns. The pressure was applied by jacks pushing on the underside of the deck near the abutments. With the load carried by the new pier, the old columns could be removed.

### Redesign saves money

Done at a contract cost of about \$38,000, the unique redesign of the bridge saved many thousands of dollars. The only alternative involved complete rebuilding of the bridge, as well as a costly detour to carry traffic during construction.

Both the redesign and the original design were worked out by W. E. Chalmers, senior designer for the Kansas highway department. The basic idea was suggested by R. M. Buell, division engineer for the Bureau of Public Roads.

### Original bridge

The bridge, located about 6 miles southwest of Kansas City, Kans., was built in 1954 with 35-45-35 spans. At that time, there was no way of knowing that the 2-lane road passing under the bridge would eventually become a 3-lane highway for eastbound traffic on Interstate 35. The deck of the bridge still carries the heavy traffic of U. S. 69.

The bridge was built with a hollow tube deck designed for H20S16 loading. Its 28-foot roadway was super-elevated to fit a 3-degree curve. The 3-column piers rested on a footing supported by three poured-in-place drilled shafts. The shafts went down to limestone.

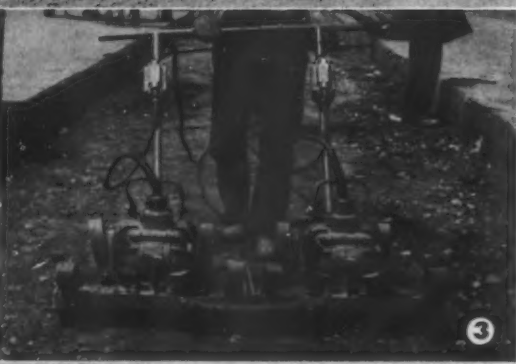
To increase the center span from 45 to 59 feet, J. A. Tobin Construction



1



2



3



4

## 4 WAYS TO BETTER PAVING PROFITS

### ① JACKSON VIBRATORY COMPACTOR

On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATORY COMPACTOR will save its cost in jig time. It's faster in attaining 100% specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Vibratory units can be arranged to exactly fit the job — individual units manually operated to reach the otherwise inaccessible spots. The machine operates in either direction — no turning required; and each vibratory unit supplies 4200 3-TON BLOWS per minute.

② JACKSON TRAILER COMPACTOR Employs the same vibratory units as the MULTIPLE (up to 6 in a single workhead, or 8 in two). May be pushed or pulled by any prime mover capable of working speeds as low as 50 FPM. Power plant supplies both single and 3-phase, 110-115 Volt, 60 Cycle, AC, and has many uses.

③ JACKSON MANUAL COMPACTOR Uses same vibratory unit as the MULTIPLE COMPACTOR. It's self-propelling, achieves 100% specified density of granular soil in 5" layers at rate of 400 sq. yds. per hour. One man can easily handle hook-up of twin units and double production. Trailer-mounted generator with compactor pick-up feature for universal operation is available. Perfect for a host of applications.

④ MUNICIPAL PAVING For jobs of this type, a JACKSON Vibratory Screed and Portable Power Plant is a very convenient, productive and inexpensive outfit. Strikes off to any crown, undercuts at curbs and side-forms, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 ft. wide. Rolls back for second passes on 4 rollers.

FOR SALE OR RENT AT YOUR NEARBY JACKSON DISTRIBUTOR  
Name and literature on request.

**JACKSON VIBRATORS, INC.**  
LUDINGTON, MICHIGAN

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New piers were built 7 feet behind the old piers. Steel girders reach 26 feet back to the abutment and 7 feet ahead to support the deck at the old column line.



A pneumatic jackhammer is used to drill through the top of an old column. The stub end is undercut into the deck; mortar fills the space.



After the load has been transferred to the new pier, the old 30-inch columns are removed by an American motor crane with a fair lead cable. Columns were cut through at the top and partially cut at the bottom so that they could be pulled over by the crane.

tion Co., Kansas City, Kans., first set about building the new piers. The 15-foot clearance of the bridge posed some difficulties in the construction.

Because of the limited headroom, H-piles—rather than drilled shafts—were used to support the piers. The equipment necessary for drilling shafts was too tall to fit under the bridge. After excavation for the footing was done, holes were dug by hand to a depth of about five feet to accommodate the individual H-piles. The digging gave the driving equipment an extra 5 feet in which to work.

#### Sheeting hammer for H-piles

The 15-foot piles were driven down to limestone by a No. 7 sheeting hammer with no leads. The hammer was handled by the nearly horizontal boom of a Koehring 405 crane stationed alongside the bridge. The piles were seated with a 3,000-pound gravity hammer in 10-foot leads. Finally, grout was poured in the hole around the top 5 feet of each pile.

The piles were capped with a 2½-foot-thick footing. To give lateral bracing, the footing concrete was placed up against the foundation of the original pier.

#### Tubes form columns

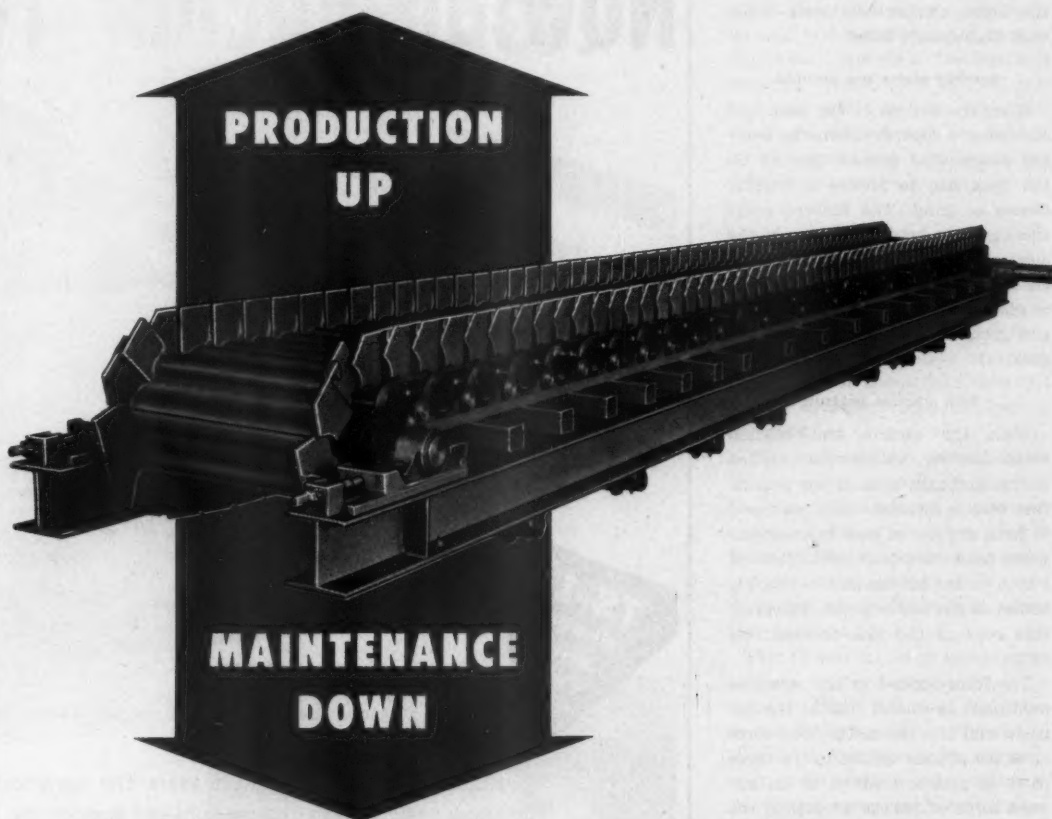
Columns came next. Easy-Mold paper-tube forms were slipped over the cage of reinforcing steel on the horizontal and then tilted up into place. Concrete placement for the columns and caps was accomplished, in the limited headroom, by a portable belt conveyor. The conveyor received concrete from a ready-mix truck.

#### Girders in pairs

Then came the steel. Two 33-foot built-up girders straddled each column. One end of each girder extended 7 feet out from the new pier to support the deck at the old column line; the other end extended 26 feet back toward the abutment. Each girder rested on a steel rocker shoe on the new pier cap. Web plates tied the girder system together.

With a girder snugged up against the end of the boom, a crane reached under the bridge to assist in setting

(Continued on next page)



## TISCO® PAN FEEDERS

Production up, maintenance down — costs down, profit up — a natural result of the durability and dependability of TISCO Pan Feeders.

Under the heaviest pounding and abrasion, vital manganese steel feeder pans, head sprockets, idlers, and rollers actually work-harden and increase their

wear resistance while they continue to function smoothly. The result is increased profits — profits in the form of higher production rates and lower maintenance costs. More information is available. Write to:

## TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION

Established 1742

HIGH BRIDGE 18, NEW JERSEY

PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.

SALES OFFICES: New York — Chicago — Milwaukee — San Francisco

For more facts, use Request Card at page 18 and circle No. 330







The job is almost done. The double I-beams straddle each column. The cost of the work: about \$38,000—thousands less than the cost of building a new grade separation.

(Continued from preceding page)

the steel. Connections were made with high-tensile bolts.

#### Bearing plates are grouted

Since the bottom of the deck was slanted on a superelevation, the bearing plates that pressed upward on the deck had to receive a leveling course of grout. The Embeco grout was forced in between the top of the steel plate and the bottom of the concrete deck. The plates were held in place by bolts that were anchored and grouted to the underside of the deck.

#### Jack applies pressure

With the girders and bearing plates in place, pressure was applied to the abutment ends of the girders. One 60-ton hydraulic jack was used to force the end of each beam downward to a calculated deflection of 1 inch on the outside girders and 1½ inches on the center girder. The pressure gage on the jack checked this figure.

The force applied by the jack was multiplied by almost four at the opposite end of a beam. The total force of 66,600 pounds applied to the three pairs of girders resulted in an upward force of 264,000 pounds at the original column line. After the jack was removed, steel shims inserted between the bearing plate and the girder maintained the pressure.

#### Columns are cut

Once the load was transferred to the new pier, the old 30-inch columns were removed. This was done by cutting each column completely through at the top and partially at the bottom. The column was then pulled over by the fair lead cable on a crane.

Since completion of the job, heavy truck traffic has been pounding over the bridge at high speeds. Although there is a noticeable up-and-down movement in the span as the trucks pass over it, there have been no signs of cracking in the deck. It looks as if the unique bridge will be serving motorists for many years to come.

Resident engineer on the job for the Kansas State Highway Commission was Mark T. Roberts. For J. A. Tobin Construction Co., George Barton was superintendent. **THE ENR**

## Manual on estimating electrical labor costs

■ "Estimator's Electrical Man-hour Manual," by John S. Page and Jim G. Nation, provides a method of estimating direct labor for complete electrical installation for any given system or plant. It points out how to arrive at a composite rate using productivity efficiency and production elements. With the composite rate, man-hour estimating can be applied with equal validity to any electrical job.

The book is divided into 15 sections that cover conduit, boxes, and

fittings; service and feeder wiring; branch-circuit items; lighting fixtures; panelboards and cabinets; safety switches; hangers and fasteners; underfloor and bus ducts; starters and motors; mounting transformers; outside construction, underground duct and cable; communication and signal systems; demolition, excavation, and concrete; and technical information.

Copies of the \$10 book may be purchased from the Gulf Publishing Co., P. O. Box 2608, Houston 1, Texas.

# Now!... Euclid Twin-Power



HERE'S BIG NEWS for scraper users. The many cost cutting advantages of all-wheel drive are now available in a medium-size scraper, the Euclid Model TS-14. With Twin-Power and a total of 296 h.p. this new "Euc" has already proved itself an outstanding performer. A one-man, one-machine earthmoving spread, it gets more work done at lower cost than any other scraper of comparable size... its high productive capacity brings a better return on investment.

Like the widely used 24 yd. "Twin", this new Euclid has a separate Torqmatic Drive and power train for each axle. It self-loads in practically any scraper material and with a pusher is a big producer on even the toughest jobs. There's plenty of power and traction to pick up a heaped load in a hurry... pull out of the cut fast... and highball on the haul and return.

The TS-14 works on grades and under adverse job conditions that stall other scrapers. Its ability to do a wide range of work—without pusher assistance—makes it the most versatile scraper in its class. This new "Twin" can lengthen your work season and give you a bidding advantage on that next job. Get the facts and figures from your Euclid dealer.

EUCLID Division of General Motors • Cleveland 17, Ohio

**Check the advantages of all-wheel drive in this new 14 yd. Twin-Power scraper!**



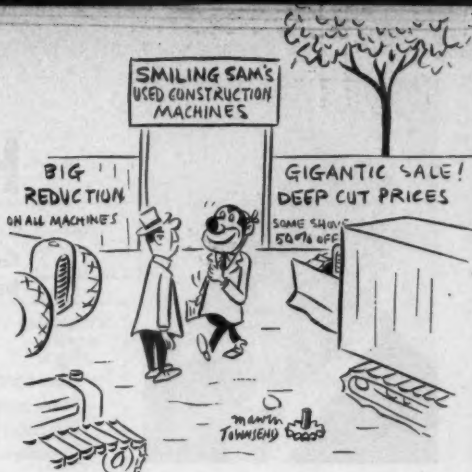
## ASCE president to judge papers for Raymond award

Frank A. Marston, president of the American Society of Civil Engineers, has been named to the panel of engineers who will judge papers submitted in this year's Alfred A. Raymond Award contest. Deadline for all papers is September 1. Marston, a partner in Metcalf & Eddy, Boston, will serve on the panel with William W. Moore, partner in Dames & Moore, San Francisco, and Ralph B. Peck, professor of foundation engineering at the University of Illinois. The award was established by Ray-

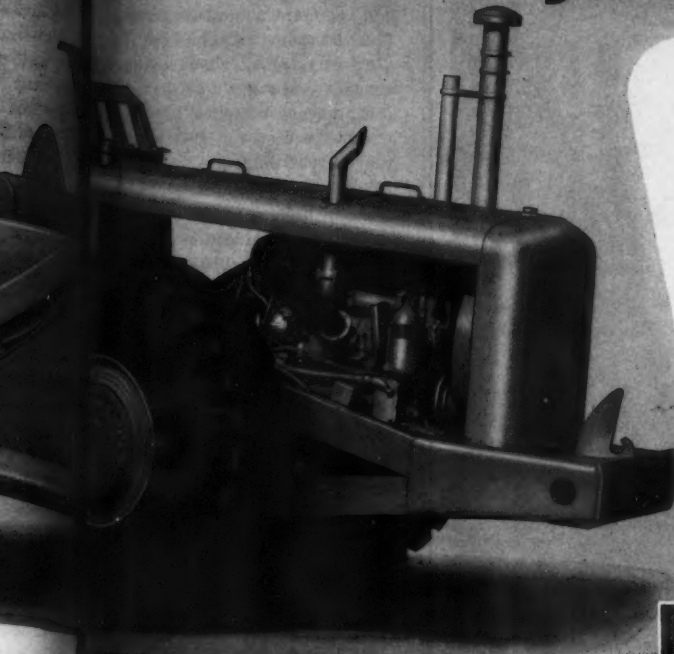
mond International Inc. to encourage ingenuity, originality, and research in the engineering of foundations for structures. The \$1,000 contest is open to practicing engineers, engineering faculty, graduate students, and undergraduates. Any aspect of the field of foundations for structures, theory or practice, is suitable as a subject for papers being submitted.

Further information on the award may be obtained by writing directly to Alfred A. Raymond Award, Room 1214, 140 Cedar St., New York 6, N. Y.

"I have to wear it. I'm taking such a loss on this sale I just can't smile."



## we in this 14 yd.\* scraper!



**TS-14 features that cut dirt moving costs**

- 2 engines — 296 total h.p.
- all-wheel drive
- NoSpin differentials
- 2 Torqmatic Drives
- converter lock-up
- 20 yds. heaped
- (14 yds. struck)

All-wheel drive and 296 total horsepower enable the TS-14 to get heaped loads without pusher assistance... make it a one-man earthmoving spread with more versatility than any other scraper in its class. Low wide bowl and four-section cutting edge speed loading and cut cycle time... blade sections are identical, adjustable and reversible.



The TS-14 works independently of other equipment... in the cut and on the fill... has the power and traction to self-load fast and work under adverse grade and job conditions that stop single engine scrapers. Its versatility and work-ability make this new "Euc" a top performer for low cost dirt moving on any scraper job... big yardage projects as well as close quarter work where concentration of equipment isn't practical.

Separate Torqmatic Drives for each axle provide a smooth, steady flow of power. There's no clutching, no delay, and no loss of momentum when changing to any of the 4 forward speeds... speed changes are made by a simple flick of the wrist at the air assist remote control lever. Converter lock-up assures maximum efficiency on grades and long hauls... this direct drive provides more usable power from each engine.



# EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

## A-C to erect plant

Allis-Chalmers Mfg. Co., Milwaukee, plans to erect a multimillion-dollar engine manufacturing plant for its Harvey Works. The new facility will add 515,000 square feet to Plants No. 1 and No. 2. The steel and concrete structure will be 1,100 feet long and 440 feet wide. The new plant will enable A-C to build a broad line of diesel, natural-gas, butane, and gasoline engines.

## Hyster promotes eight in U. S., foreign offices

Robert Henderson has been appointed chief engineer of Hyster-Sonnerdale Ltd., distributing organization for Hyster industrial trucks and tractor equipment manufactured in Australia.

The Portland, Ore., manufacturer has promoted three in its Danville, Ill., plant. Don Longer is the new general foreman of Plant No. 2; James Strader is personnel manager; and Axel Nelson is general foreman in charge of all fabricating operations in Plant No. 1.

Pete Conner has been named office manager of the company's retail Industrial Truck Division dealership in San Francisco. He is replaced in Danville by Ted Burmeister, as supervisor of the machine order section in the sales department. Robert Strawser is now the factory parts manager.

Vice president of manufacturing Jack F. Lewis has been named managing director of Hyster Ltd. in Scotland. He has also been elected a director of Hyster N. V., another wholly owned subsidiary in Nijmegen, The Netherlands.

## Book on aluminum's use in modern architecture

The 1960 supplement, "Aluminum in Modern Architecture," pictures and details 30 recent buildings selected from all over the world and distinguished both for architectural importance and imaginative use of aluminum.

The book also contains data on corrosion and aluminum, architectural types, the future of aluminum in modern architecture, and aluminum in modern housing.

Copies of the book may be obtained from the publisher, Reynolds Metals Co., Richmond, Va.

For more facts, circle No. 331





Franklin G. Floete is administrator of the General Services Administration, which handles work equal in dollar value to combined current budget expenditures for civil works of the Corps and BuRec.

## How to do business with GSA

**General Services Administration has plenty of work, but be ready to meet its specs, standards, inspection**

by E. E. Halmos, Jr.

In your search for future construction business, take a good look at the General Services Administration, the housekeeper and construction agency for most civilian U. S. government departments and agencies.

Right now, for instance, it has a new construction program equal in dollar value to the combined expen-

ditures set up in the current budget for the civil works of the U. S. Army Corps of Engineers and the Bureau of Reclamation. And it spends \$60 million or more each year on what it calls "repair and improvement" work, which may entail anything from fixing broken windows and painting offices to constructing ad-

ditions to government buildings.

GSA is a prime market for contractors, architects, and engineers. It leans heavily on contract work in all phases of construction and maintenance what it considers a minimum staff of its own—even for supervision.

### It's a big market

Before getting into details of work, consider the size of this market.

As of now, GSA's Public Buildings Service (one of five branches) has a construction program under way comprising some 123 projects that will represent a total expenditure of \$1.23 billion when completed.

To carry on this program for the coming year—and to take care of other agency activities as well—the budget request for the 1961 fiscal year is \$507 million.

Some 49 new building projects have recently been proposed for addition to the new construction program.

The agency has jurisdiction in some manner over a total of 10,500 locations of government offices in the United States. Of these, 550 are government-owned structures operated entirely by GSA; 4,300 are other government-owned buildings (such as post offices) for which GSA has maintenance and other responsibilities; 5,600 are leased by GSA (as agent for other agencies) from private owners.

In the 6,200 government-owned or leased locations directly under GSA's management, there are over 3,000 acres of net floor space for 483,000 federal employees of some 65 departments and agencies.

In addition to new construction, the agency carries on an average of 400 to 500 repair and improvement projects each year.

General Services employs about 37,900 persons. But only 2,500 of them are engaged in planning and supervising the building and repair programs. The cost of supervision, including that done by contract, is estimated at less than 2 per cent of total contract costs.

### Tips on business with GSA

If you want to contract business with GSA or Public Buildings Service, here are some tips.

You'll be held strictly to your contract as to completion dates and details.

You can expect plenty of change orders and some extra bookkeeping.

It will pay you to get shop drawings and samples completed early in the job for necessary approvals.

You must insist on obtaining promptly any details from the architect or details that are to be supplied by the government.



Geared with Fuller ROADRANGER... Three International Model 495 Pyscrapers belonging to V. H. & M. Construction Co., Denham Springs, La., handle a total of 4500 to 5000 cu. yds. of material every 10½ hrs. in construction of Interstate Highway I-10 between Jennings and Egan, La.

## Faster work cycles boost profits... COUNTERSHAFT BRAKE SPEEDS UPSHIFTS

### Longer gear and bearing life with Pressure Filtration and Lubrication

Heavy rainfall and deeply-rutted, wet blue-clay surface have been major obstacles to the work of V. H. & M. Construction Company on a Louisiana highway project. Fighting weather, time and terrain, V. H. & M. handles a total of 4500 to 5000 cu. yds. every 10½ hours with 3 International Model 495 Pyscrapers equipped with semi-automatic 9-

speed Fuller R-1160 ROADRANGER Transmissions. Standard equipment on the R-1160 includes the Fuller Air-Powered Countershaft Brake and Pressure Lubrication and Oil Filtration System.

E. D. Pinkston, Superintendent, says, "Thanks to our Fuller-equipped Pyscrapers, our production is very good despite miserable operating con-

ditions and material which is extremely tough to handle. Our operators like the Fuller countershaft brake. It gives quick, easy upshifts without double clutching, keeps speeds up and cuts cycle time. And the pressure lubrication and filtration system prolongs gear and bearing life."

Ask your dealer about the off-highway Fuller Transmission... with countershaft brake and pressure filtration system as standard equipment... designed to put more profit in your operation.

# FULLER

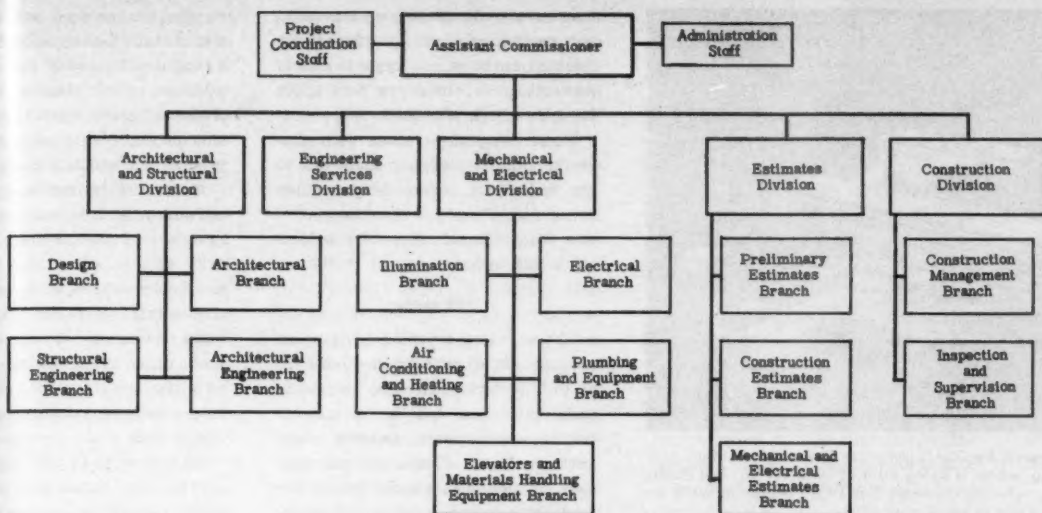
TRANSMISSION DIVISION  
MANUFACTURING COMPANY  
KALAMAZOO, MICHIGAN

Subsidiary EATON Manufacturing Company

Balt Drop Forge Div., Milwaukee 1, Wis. • Shodor Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.  
Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative

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The divisional and branch setup in the office of the assistant commissioner for design and construction, which is under the Public Buildings Service of the General Services Administration.

## THINGS START LOOKING UP

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Our competent engineering staff and complete manufacturing facilities will produce . . .  
**A BETTER BLOCK** for your particular requirements.

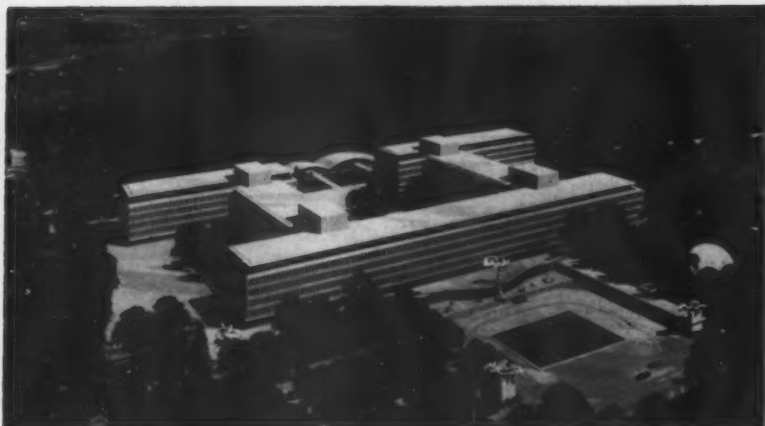
- ✓ ANY CAPACITY
- ✓ ANY SIZE AND NUMBER OF SHEAVES
- ✓ ANY TYPE BEARING
- ✓ ANY STANDARD OR SPECIAL CONNECTION
- ✓ DELIVERY IS POST HASTE
- ✓ BE SPECIFIC . . . GET McKISSICK



**McKISSICK PRODUCTS CORPORATION**  
Box 2496 Tulsa, Oklahoma

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Typical of the larger structures covered by GSA's activities is the \$41 million new Central Intelligence Agency building, which is being built at Langley, Va. The Public Buildings Service, one of GSA's five services, currently has \$1.23 billion in work on buildings ranging from big ones like this to small post offices.

Works Agency, the Bureau of Federal Supply (then a part of the Treasury), the National Archives, and the remaining disposal activities of the War Assets Administration be placed under a single management.

It has grown mightily since then.

Today, GSA has responsibility for:

- (1) procurement, supply, maintenance, and use of real and personal property; (2) disposal of surplus property; (3) records management; (4) management of the government's inventory of defense materials; (5) administration of a national reserve of defense-plant equipment; (6) government-wide assistance in rate and service matters pertaining to public carriers and utilities.

Of direct concern to construction men is the first of these duties, administered by the Public Buildings Service. But, just for the record, consider this: in GSA's care are government assets with a net worth of over \$10.8 billion.

The over-all boss of the agency since 1956 is Franklin G. Floete, administrator. He's backed by a deputy administrator and five commissioners, each of whom heads one of the "services." The top man in Public Buildings is Karl Wallace, commissioner.

#### A job grows

Since it is, in fact, housekeeper and agent for other departments and agencies, PBS does not initiate plans for new construction itself. As a good manager, of course, it keeps constant check on the properties and does decide and act when normal repair and maintenance are required. And it works with all of its "tenants" to keep up a constant list of requirements.

Generally, then, a request for a new building—or for a major alteration or addition to an older structure—begins with the "tenant." Thus, the postmaster at, say, North Platte, Nebr., may find that facilities are becoming grossly inadequate. There isn't room for storage, new machinery, personnel, or efficient operation. In addition, the building's single elevator may be outmoded.

Other tenants may have complaints. The clerk of the federal dis-

trict court, for example, may find his accommodations insufficient. A regional agent of the Department of Agriculture is unable to find space for his records and staff.

These complaints, along with suggestions for remedying them, go to the individual federal departments concerned. They are then forwarded to a GSA regional office for consideration and action.

#### PBS study

The next step is for PBS engineers, working out of the regional office, to go over the situation—not only as to immediate need but as to possible future requirements. Growth prospects in North Platte, for example, may be such that several federal departments may be contemplating ex-

pansion in the area and will require larger staffs and more office and storage space. This may justify a modification to an existing building or, if the structure doesn't lend itself to this or there isn't enough available land, a new building may be required. If it is determined that alterations or additions are possible, a determination of need is made and a priority established so that the project can be considered in proper perspective along with the thousands of other requests of similar nature from other areas. Estimates of cost and the best possible estimates of future requirements are prepared to insure that, when completed, the new work will serve to best advantage.

If a new building is required, a somewhat similar process is followed.

## "We carry up to 2,500 lb. more on FORD Tandems and still outrun the



**SAYS HARRY R. KUNZ  
PRESIDENT, KUNZ PAVING CO.  
SAN MATEO, CALIFORNIA**

Mr. Harry R. Kunz, a Registered Public Accountant in the construction field for 20 years, started the Kunz Paving Company in 1954. He and his two sons, Harry Jr. and Gerald, expect to do \$500,000 worth of work with their fleet of 16 Ford Trucks this year. Here is what he has to say about these trucks.

"Our experience with Fords has proved them to be the best all-around truck we can buy! They haul more payload, cut down considerably on trip time and cost less to operate and maintain.

"The lighter chassis weight of the Ford Tandems lets us carry as much as 2,500 pounds more than competitive makes. This extra payload means that we can haul as much in ten trips as the others do in eleven. Our Fords will beat them on a trip-for-trip basis, too!

"On a 30-mile haul, our '59 T-800 equipped with Transmatic Drive will lap other trucks on the same job every fourth trip. This not only reduces our hauling costs but it makes our Ford's more attractive as rental units for other contractors. One of our associates had two of his trucks and two of our Fords working on the

same job. He actually paid for the rental of our trucks by the extra trip they made.

"Our cost records, set up on an hourly basis to make it easier to prepare bids, show that the longer it takes to build into Ford Trucks makes the less costly to operate. We have a '56 Ford T-750 with over 100,000 miles on it that we use as a base for our tandem hauling costs. In spite of its high mileage—gas, oil, tire maintenance and repairs amount only \$2.08 per hour. Facts and figures like these keep us sold on Ford Trucks for our business."



## FORD TRUCKS



and will require... office and... justify a... building... lend itself... available... may be required... that alterations... sible, a delay... ade and a pro... at the project... proper perspective... thousands... similar... estimates... through the lengthy process... required for major construction.

**Plans and spex**

Assuming that this process has been followed, that Public Works

Committees of both houses of Congress have approved, and that "site and planning" money is made available, PBS now moves to get designs and other details ready for contractors.

This process begins in the Washington headquarters (office of design) with a circular letter to all registered architects or architect-engineers in the state in which the new project is to be located. This process is the same for major alteration work. Civil engineers, as such, would be notified only about work that the agency considered to be purely engineering, such as a sewage plant in connection with some federal development.

In these letters, architects are given a brief description of the proposed

work and the estimated construction cost, and they are asked if they are interested in a negotiated contract for their services. PBS prefers to deal with local men on the well proved theory that these architects are better acquainted with local conditions, codes, materials, and contractors.

Once selected, the architect will prepare complete plans, including working drawings, specifications, necessary shop and checking drawings, and visuals. He may even provide information to model makers for construction of a scale model if that is desirable. A scale model often is needed for purposes of demonstrating to interested parties that the building will have a suitable appearance—one that is in conformity with local conditions.

In general, PBS gives the architect a free hand in preparing his designs, but it tries to insure that the finished work will conform as well as possible with local architectural schemes.

Almost all architectural contracts contain an option for supervision of subsequent construction. In most cases, PBS takes up this option. On some projects, such as the Washington, D. C., State Department building addition that almost triples the size of the original structure, the architects have kept four men in residence for inspection and supervision.

Final designs are reviewed both in the regional offices and in Washington, with final approval coming from headquarters.

#### Enter the contractor

This work accomplished—and Congress having provided specific construction money—the stage is now set for the building contractor.

The prospective job is advertised by the regional office concerned and, once this is done, no interpretations of the specifications will be given until bids are opened.

Bidders may obtain, on request and free of charge, three complete sets of plans and specifications, properly scaled for quantity take-offs. Additional sets are also obtainable, on payment of a fee for each set. But the fee will be refunded if the sets are returned to PBS in good condition after bids have been opened.

Construction contracts will not include certain special work, such as installation of elevators, moving stairways, or prison equipment. This work is always let under separate prime contracts.

#### No prequalifications

PBS maintains no prequalification list of contractors, but it has certain criteria that the contractor must meet:

1. He must be able to provide required bid bonds and surety on performance.
2. He must take full responsibility for subcontractors.
3. He must be prepared to do at least 12 per cent of the work with his own forces. (PBS wants no "brokers.")
4. He must be able to show evidence of qualification to do the work. A man who has built only small homes probably wouldn't qualify for a major monumental type of government building.
5. He must be prepared to sign a clause certifying that he (and his subs) will not refuse to testify before any proper investigative agency as to details of the contract he now holds or any others he may have held previously.

As to qualifications, PBS feels that to maintain prequalification lists of contractors all over the United States and its possessions would be a mammoth task that probably wouldn't be worth the expense. It would rather rely on the investigations of the surety companies and on its own strict interpretations of contract responsibilities. However, on certain maintenance and repair work such as paint-

# morayload on our utruther trucks on the same job!"

## Again in '60... FORD PICKUPS beat all leading makes in Gasoline Economy!

**Ford Six delivers 13.1% better gas mileage** in second running of Economy Showdown U.S.A.\* Standard 1960 1/2-ton pickups of the five leading makes were purchased from dealers just as you would and run both empty and

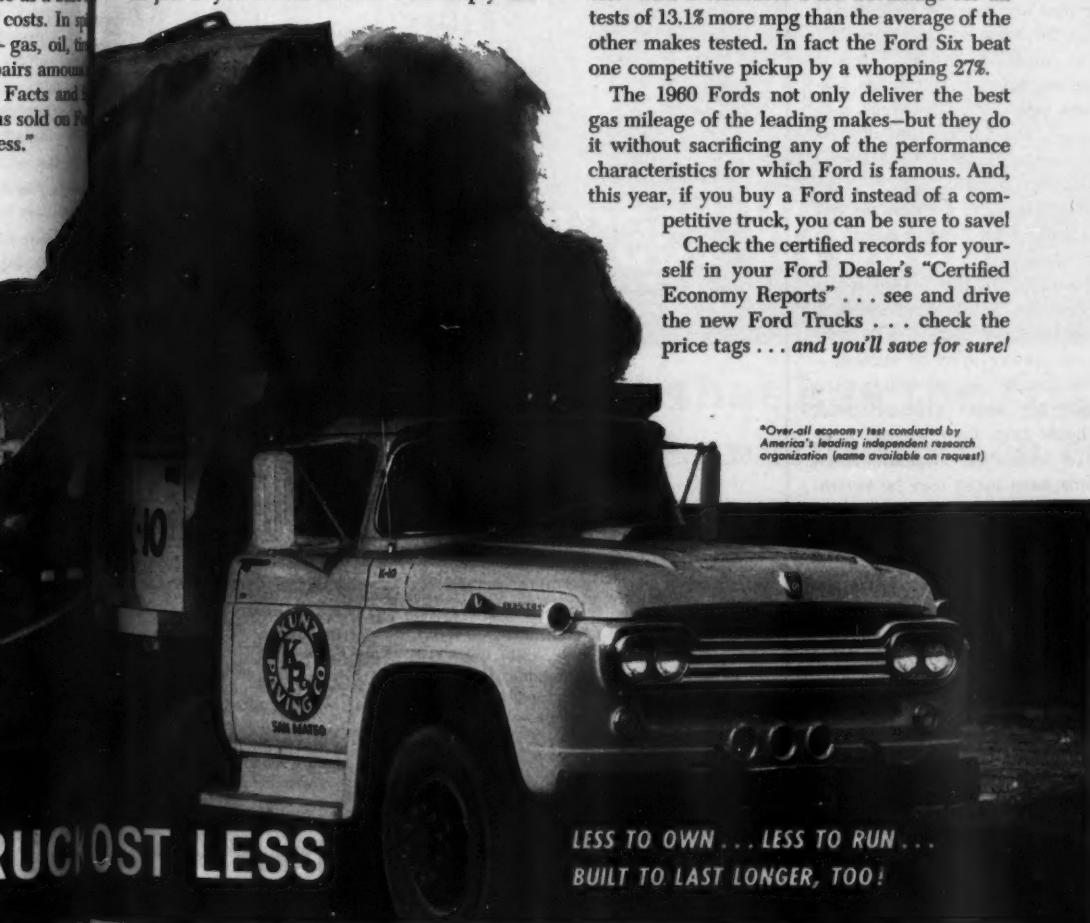
loaded, over flat terrain and hills, at low and high speeds, under city traffic and retail delivery conditions.

Certified results show the Ford Six won every test—with a combined Ford advantage for all tests of 13.1% more mpg than the average of the other makes tested. In fact the Ford Six beat one competitive pickup by a whopping 27%.

The 1960 Fords not only deliver the best gas mileage of the leading makes—but they do it without sacrificing any of the performance characteristics for which Ford is famous. And, this year, if you buy a Ford instead of a competitive truck, you can be sure to save!

Check the certified records for yourself in your Ford Dealer's "Certified Economy Reports" . . . see and drive the new Ford Trucks . . . check the price tags . . . and you'll save for sure!

\*Over-all economy test conducted by America's leading independent research organization (name available on request)



# RUCIEST LESS

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BUILT TO LAST LONGER, TOO!

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(Continued from preceding page)

ing and electrical and plumbing work, regional offices maintain some lists of qualified contractors.

#### Operations and payments

Bids are received and opened at the regional offices, and then forwarded to Washington for evaluation.

In general, PBS likes to base its award on the lowest base bid, without regard to any alternates that may have been offered. Often, some of these alternates are things PBS would like to do but could call for only if the base bids are low enough to leave some surplus in the amount Congress has approved for the project.



### ... and for NEARBY SERVICE on Black & Decker

**tools.** Black & Decker maintains 50 factory service branches plus authorized service stations to give your B&D tools the attention mechanical products need periodically. Keep your B&D tools in top condition, on the job all the time.

Only factory parts and factory-approved methods are used. Fast service and reasonable cost, always.



**SWIFT SERVICE** says be sure to ask about:

**FREE TOOL INSPECTION** no cost, no obligation.

**STANDARD B&D GUARANTEE** after completion of all recommended repair work.

You'll find the location of the nearest B&D repair facility in the Yellow Pages under "Tools-Electric," or write for address to: THE BLACK & DECKER MFG. CO., Dept. 1304-S, Towson 4, Md.



Quality Tool Service  
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While Washington is evaluating bids, the regional office proceeds with an investigation of the financial and other responsibility of the bidders. It usually takes about a month to complete these evaluations, coordinate them, and select a low bidder. PBS very seldom—if ever—operates on a letter of intent. A full and final contract is then forwarded to the successful bidder for his approval and signature.

The next step for the contractor is a conference with the supervisory staff of the architect-engineer, or PBS, to cover the very important matter of payments.

In this conference, the entire job is broken down in terms of quantities and costs of materials, and costs of labor to erect or install them. This breakdown is then used as basis for payment. Each month, the contractor prepares a statement indicating how much material of each type has been put in place, how much labor was used, what other materials have been delivered and are stored ready for installation. If approved by the supervisory staff, this "bill" becomes the basis for payment.

The 10 per cent retainage is withheld on all payments until the job is 50 per cent completed. After that time, full payments may be made.

And if the government should put the project to use before scheduled completion, additional payments may be made out of the retainage to compensate for inconveniences caused the contractor by this prior use.

PBS contracts make no attempt to tell the contractor what types of equipment or what construction methods he may use.

The reason for the many change orders that are usual in this type of work is the same as that for most building construction. The tenants are forever changing their minds, getting new organizational setups, new machinery, etc. Government departments are no strangers to this kind of changing around. GSA tries to keep the changes to a minimum, but has to bow to the tenant agency in many cases.

One problem in this regard is the fact that the total expenditure is fixed by Congress; thus, there is virtually no leeway short of another—and often embarrassing—trip to Capitol Hill for added appropriations. This holds true, even though forecasts on which the original appropriations were based may be several years old when work starts.

As a result, changes are often made in the long period from idea to contract to get as much extra utility as possible in the basic design. PBS figures on three years from "planning" money to construction contracts.

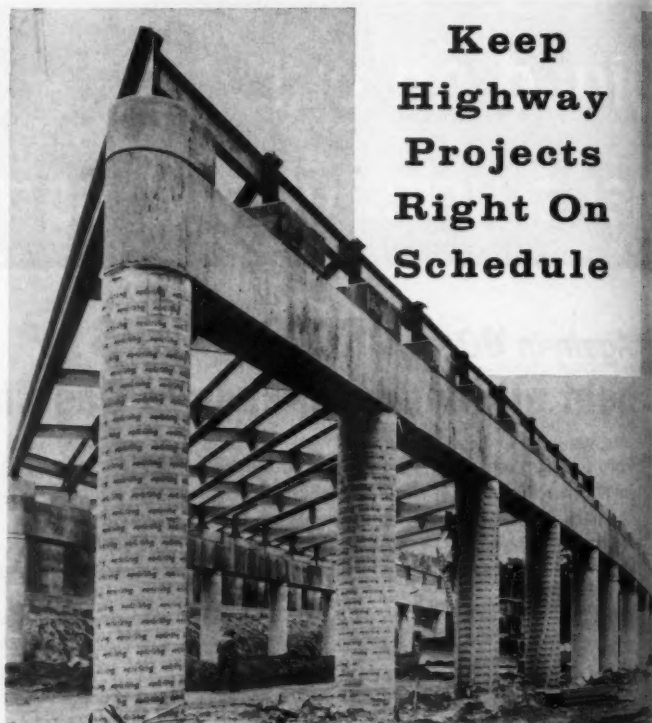
The final step for the contractor is to take care of "oversights and omissions" to the satisfaction of the inspectors.

That done, the final payment is made, and the government agency moves in. And then a new set of contractors of all kinds, including window washers, groundskeepers, painters, and custodians, takes over.

THE END



"Stop worrying, boss, I starched the sheet and ran the shovel outside."



Expressway, Elmsford Section, Westchester County, N.Y.  
Contractor: Mount Vernon Contr. Corp.  
Chief Engineer: Philip P. Fox.  
Designer: Charles H. Sells, Consulting Engineer of New York City.  
Photo: Fred & Leo de Wys

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FIBRE FORMS**

Completion schedules are important to every contractor involved in the modern highway improvement program. To speed the construction of bridges and overpasses and maintain their schedules, many alert contractors form round concrete piers with Sonoco SONOTUBE Fibre Forms. These strong, low-cost forms are easy to handle and place; and, even with their light weight, only minimum bracing is required. Stripping is simple, quick. Stay on schedule with SONOTUBE Fibre Forms—the fastest, most economical forming method for round concrete piers and columns. In fact, wherever round concrete columns are specified... in bridges, buildings, or any structure... you'll save time, labor, and money by using SONOTUBE Fibre Forms. Available 2" to 48" I.D., in standard 18' lengths or as required. Can be sawed at the job.

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**SONOCO**  
Construction Products

SONOCO PRODUCTS COMPANY

For more facts, use Request Card at page 18 and circle No. 336

CONTRACTORS AND ENGINEERS



## Canal dredging nears end for Beauharnois project

Digging a 15-mile canal between Lake St. Francis and Lake St. Louis, southwest of Montreal, Canada, is one of the main operations of the Beauharnois Power Project.

When excavation was first undertaken, the estimated job total was for the removal of 250 million cubic yards of material. The principal excavator was a hydraulic pipeline dredge, the Hydro-Quebec, designed by the Ellicott Machine Corp., Baltimore. The 36-inch unit has a maximum digging depth of 50 feet, and is able to dig boulder clay and discharge it to spoil areas through a 4,000-foot pipeline. The rotating cutterhead, weighing 40 tons, has excavated boulders weighing as much as half a ton.

For power purposes, the canal will be 3,300 feet wide. It is not only the main artery furnishing water to the power station, but also contains a 600-foot-wide 27-foot-deep channel to accommodate deep-draft ocean-going ships. Two locks, each with a 40-foot lift, take care of an 80-foot drop in the water level. Excavation work for the channel will be completed late this year.

## Spring maintenance is a must for cooling systems

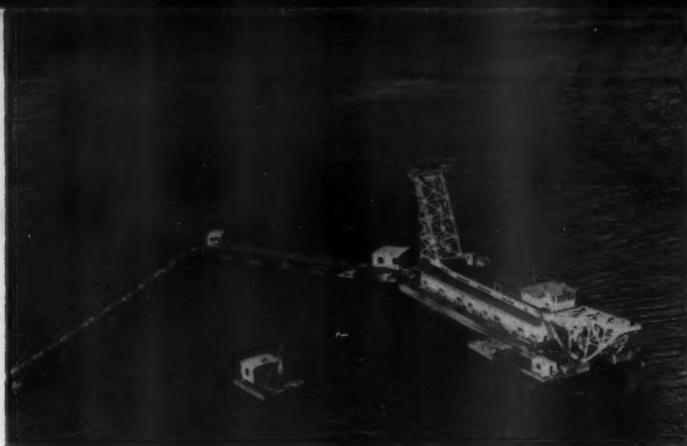
Cooling-system maintenance now, at the end of winter, can prevent damage to an engine, or even save it from ruin. A properly working cooling system practically pays for its own maintenance.

To speed up maintenance jobs on a fleet, group six or eight vehicles together for draining and servicing. Place the vehicles in two rows facing each other and try this 8-step assembly-line technique:

1. Drain out antifreeze.
2. Flush the cooling system with plain water. If there is corrosion, scale, or grease, use a chemical cleaner. Pressure-flush the radiator and engine block with water and compressed air if there are signs of rust plugging the radiator tubes.
3. Check the thermostat for operation at proper maintenance.
4. Check hoses for deterioration and replace weak or worn ones. Tighten hose clamps and replace broken ones.
5. Examine fan belts and other drive belts for signs of wear and check them for proper tension.
6. Make sure the radiator pressure cap is free of rust or dirt, and that the rubber gasket is in good condition. Remove all obstructions—bugs, leaves, dirt—from radiator air passages.
7. Refill the cooling system with fresh water and add a good rust inhibitor.
8. Run the engine to adjust coolant level, then check thoroughly for leaks in radiator, hoses, water pump, and cylinder-head gaskets.

This program assures a contractor of proper cooling-system maintenance—a must for the service department and for extra profits.

For more facts, use coupon or circle No. 337.



The Hydro-Quebec hydraulic dredge, designed by the Ellicott Machine Corp., excavates boulder clay for a navigation channel that is part of the Beauharnois Power Project. The electrically powered dredge is supplied with current from shore by means of a submarine cable.



# This is the only Impact Wrench

that has the **GUTS** to prove  
its maintenance costs peanuts!

Take an Impact Wrench that's built with extra ruggedness clear through. Take a Factory Service Branch network that keeps accurate repair records. Result: *proof positive* that Black & Decker Impact Wrenches have a phenomenally low maintenance cost.

No other Impact Wrench approaches the Black & Decker because no other Impact Wrench can match the power, speed and maintenance-free construction of a Black & Decker. From drive spindle to reversing ring, every part has been designed to eliminate breakdown problems.

Wherever a bolt, nut, wood or lag screw must be spun, or drilling and tapping done—in machinery moving, installation work, general maintenance or production—a B&D Impact Wrench will do the job faster, with less fatigue, and at lower cost. Mail the coupon or call your B&D distributor for a demonstration.



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Quality Electric Tools

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☐ Drills



☐ Hammers



☐ Screwdrivers



☐ Bench Grinders





Two "pickers" are chiefly responsible for the good concrete aggregate produced for an interstate job between Jamestown and Dawson, N. Dak. They pick out chunks of iron oxide and large pieces of shale from the rock being processed. This keeps the combined percentages of iron oxide and shale under the 2 per cent allowed by the specifications.

At plant producing aggregates for concrete-paving project . . .

## Rock picking beats iron-oxide problem

Producing good concrete aggregate in North Dakota has always been a problem. Too much iron oxide and shale in the natural gravel deposits make for a poor aggregate.

But contractors on 12.2 miles of interstate highway from Jamestown west to Dawson discovered a way to eliminate most of the undesirable rock from the finished aggregate for this job.

Three crushing plants were set up by three different contractors to obtain the aggregates. All the plants produced good-quality aggregate. Hallett Construction Co., Crosby, Minn., one of the three, kept production consistently high while keeping the percentages of iron oxide and shale consistently low.

How was it done? A combination of good men, well maintained equip-

ment, and plenty of rock-breaking know-how.

### Bad rock is picked out

The big problem was getting the brown rocks containing iron oxide out of the gravel. The rocks couldn't be floated out because their density was about the same as good stone. They couldn't be screened out because their size was about the same as the good stone. They could be picked out, but since there aren't any rock-picking machines on the market, the contractor put a couple of men to work picking the undesirable rocks from a wide conveyor belt. It was a tedious job, but it was a simple and effective way of getting rid of most of the iron oxide. The men also tossed out the larger pieces of shale that passed under their hands. Smaller pieces were floated away in a double log washer.

By using this method, Hallett was able to keep the amounts of undesirable rock in the finished aggregate to within the required percentages. The North Dakota State Highway Department required that the combined percentages of iron oxide and shale should not exceed 2 per cent.

### Big contract

Hallett subcontracted the aggregate and sand production from Northern Improvement Co., Fargo, N. Dak., which held the paving contract for 12 miles of the 4-lane divided highway. The long stretch of pavement required about 100,000 tons of aggregate and 50,000 tons of sand.

Both sand and rock-producing plants were set up at the western end of the contract near a small lake that provided a convenient source of water. The material for producing the sand was adjacent to the plant, but the gravel for the aggregate had to be trucked in from a distance of about 3 miles.

The crushing plant was put together according to Hallett's design from components manufactured by



Nearing completion is the 21-story East Ohio Building in Cleveland. This modern skyscraper is strengthened with 2300 tons of reinforcing steel—all tied with Cal-Tie Wire.

## Cal-Tie Wire helps get the job done safely...swiftly...economically

Tri-State Steel Construction, Inc. of Cleveland was the reinforcing steel erector of this new office building. To help get the job done in the record time of five months, Tri-State workmen carried re-bar tie wire the safe way—the Cal-Tie Wire Way.

Walter Kennedy, president of Tri-State, reported: "We were very much impressed with the safety features, ease of handling, storing, plus working speed afforded by Cal-Tie Wire in handy reels."

Cal-Tie Wire in belt-borne dispensers makes tying much safer. There are no loose coils to trip workers, catch on clothing or snag protruding objects, any of which often cause serious injury. The dispenser prevents kinking and tangling . . . allows fast tying in close quarters . . . reduces wire waste from excessive cut ends.

Cal-Tie Wire is available in stock in 16 gage, annealed or galvanized; other sizes 14-20 gage upon request. For complete details, call the nearest CF&I sales office.

## CAL-TIE® WIRE

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In the West: THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) • Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita

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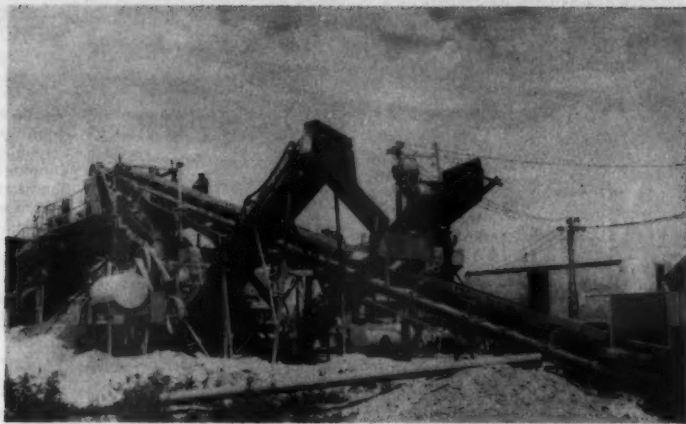
Wash water is pumped from the nearby lake by a Fairbanks Morse 8-inch pump driven by a Cummins 250-hp diesel. The water flows through Naylor 12-inch pipe to the crushing plant.

CONTRACTORS AND ENGINEERS





The aggregate feeder conveyor stems out from the stockpile, left, and a supplementary feeder adds fines. Material rides to a Simplicity single vibrating screen. As aggregate is sprayed, material over 1 1/4 inches passes to the picking belt.



Output from the picking belt and washer goes to this inclined conveyor leading to the Diamond Iron Works vibrating screen. Material over 2 1/2 inches passes to a jaw crusher, smaller rock to a cone crusher. Conveyors feed back the crushed rock.

various companies. In passing through the plant, the material was sprayed twice, washed twice, screened three times, and crushed by jaw and cone crushers. The plant produced two types of material (minus 1 1/2-inch and minus 3/4-inch) at the same time. Because the equipment was well maintained, there was little downtime. Production was consistently high, averaging about 2,300 tons per 16-hour day.

During the winter months, the stockpile to feed the crushing plant was built. The source material was screened at the pit to yield rock from 3/4 inch to 12 inches in size. It was then hauled by truck to the plant stockpile.

#### Dozers work stockpiles

The stockpile was worked by one and sometimes two Cat D8's. The dozers pushed the material into a trap that guided it onto an inclined belt conveyor. At times it was necessary to add finer material to the plant. This was done by using the wasted oversize from the sand plant. The wasted material was dumped by truck into a hopper and belt-fed to the main conveyor. Since the wasted material contained very little iron oxide, its addition tended to reduce the over-all percentage in the final product.

(Continued on next page)



Good preventive maintenance kept plant downtime to half an hour during the first 2 1/2 months of the job. Lubriplate 630-AA—which does not run when it gets hot—is being used to grease the main bearing of the Simplicity vibrating single-deck screen.



Here, PSR-9 compacts gravel road in Jefferson County, Wisconsin. Knocking action of pneumatic tires, plus oscillating action on all 9 wheels, helps the PSR-9 key and lock loose materials in place. Helps eliminate hairline cracks when rolling asphalt, too.

## LOWER YOUR OPERATING COSTS with the VERSATILE PSR-9

Handles both big and odd-lot jobs profitably . . . meets specs fast on breakdown, intermediate, or finish rolling.

You're looking at the world's most modern pneumatic roller—introduced last year and designed from the ground up to answer your needs for more efficient rolling. The PSR-9 gives you 3 to 10 tons of compaction weight on 9 wheels. All wheels oscillate for contour compaction. There's one-half inch overlap between front and rear tires . . . over-all rolling width, 5'8" per pass.

Sliding gear transmission with torque converter gives operator

smooth, infinite speed selection over 3 speed ranges, at up to 15 mph in both directions. Direction of travel and speed are both controlled by single combination lever for easier and more accurate shuttle rolling and control.

Other operator controls include power steering, and power brakes. Low center of gravity, mechanical parking brake, and short 18'10" outside turn radius are other features your operators will like. Why not get the most quality your dollar will buy in your next pneumatic tire roller? See the PSR-9, or bigger 10 to 30-ton companion model PSR-30 . . . today.



New forward-reverse throttle (arrow) gives operator instant one-lever control of direction and speed. Push forward for forward travel, pull back for reverse . . . that's all there's to it!



"Big brother" to the PSR-9, 7-wheel PSR-30 offers 10-30 ton compaction weight . . . speeds to 19.4 mph forward and reverse. Note how dual controls, plus special frame contour, give operator clear view of both guide and drive wheels on either side.

Tell me more about the  
☐ PSR-9 ☐ PSR-30

NAME  
COMPANY  
ADDRESS  
CITY, STATE

TITLE

B2-C&E

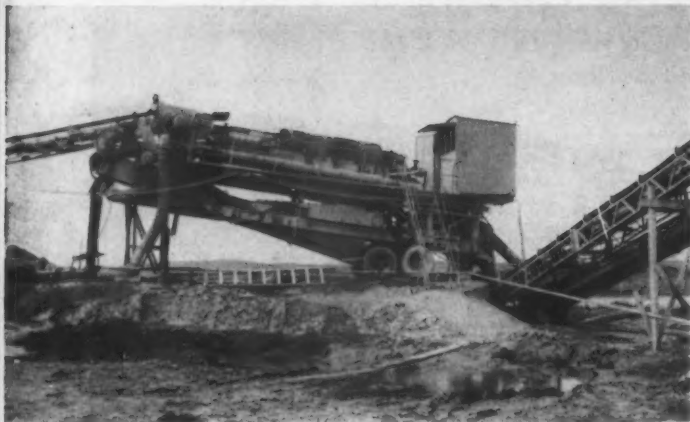
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SPRINGFIELD, OHIO  
A Division of Keating Co.





An inclined conveyor carries material from crushers to this washing and screening unit. Material passes to the Diamond Iron Works rotary scrubber, then to the wet 3-deck vibrating screen where two sizes—minus 1½ and minus ¾-inch—are produced. The two sizes drop to the conveyors at right.



Power for the plant components—excluding the crushers and log washer, which are powered by individual diesel engines—is provided by this Katolight 125-kw portable plant driven by a GM diesel. Beside the generating unit are a diesel-fuel storage tank and drums of Standard Stanolube S-1 lubricating oil.

leading contractors use **Ramset**

Just a pull of the trigger and versatile Ramset tools set threaded studs, drive pins and other types of fasteners into concrete or steel without pre-drilling or plugging.

Beside speed, versatility and one-hand operation, you can choose from industry's widest selection of fasteners and powder charges.

Discover for yourself why Ramset is today's most widely used powder-actuated fastening system. Write direct or call your Ramset dealer, listed under "Tools" in the Yellow Pages.

WHERE SPEED IS VITAL



## Ramset Fastening System

OLIN MATHIESON CHEMICAL CORP. • WINCHESTER-WESTERN DIV. • 285-B WINCHESTER AVE. • NEW HAVEN 4, CONN.

(Continued from preceding page)

### Wash and pick

From the first conveyor belt, the material dropped onto a Simplicity 4x12 single vibrating screen. As the rock was washed by means of spray-bars, the material over 1¼ inches passed on to a wide horizontal belt conveyor. Two men standing beside the belt continually picked off the larger pieces of shale and iron oxide.

The material passing the single screen dropped down to an Eagle Iron Works double log washer. This machine eliminated some of the smaller pieces of shale and cleaned the small rock. Material from both the log washer and the picking belt passed to the second inclined conveyor.

### Screen and crush

The second conveyor carried the rock to a screening and crushing setup. The Diamond Iron Works 2-deck vibrating screen passed material over 2½ inches to a Diamond Iron Works 15x36 jaw crusher. Material between 2½ and 1½ inches went to a Symons 3-foot cone crusher. When the load on the Symons crusher got too heavy, a Nordberg 3-foot cone crusher was put on the line. Material under 1½ inches was finished size. As the rock came out of the crushers, it was fed back to the screen in a



Milford Fred, superintendent for Hallett Construction Co., Crosby, Minn., subcontractor on aggregate and sand production, is making this last job a good one. At 66, and after 26 years with Hallett, he intends to retire when the job is finished.

For more facts, circle No. 340

## CONTRACTORS

...are you getting the benefits of

**Sterling**

RE-BAR TIE WIRE?



SPEED...  
SAFETY...  
EFFICIENCY

More and more, contractors are finding that Sterling Re-Bar Tie Wire in the handy belt dispenser, is the quicker, more economical way to tie reinforcing. Sterling Re-Bar Tie Wire is the tougher, stronger, more easily worked wire that produces snug, firm ties. In addition to the multiple advantages of Sterling Wire for tying re-bars it is equally ideal for tying metal lath and wire fabric or for general purpose use. See your distributor and specify Sterling Re-Bar Tie Wire... the better wire for better ties.



Sterling Re-Bar Tie Wire is available in coils to the box. No. 14 or No. 16 wire.

**NORTHWESTERN  
STEEL AND WIRE  
COMPANY**

SINCE 1879  
STERLING, ILLINOIS

For more facts, circle No. 341





The minus 1½ and minus ¾-inch rock drops into overhead bins for loading into this International 180 truck with Galion 8 to 10-yard body. The pipe leading from the mouth of the bin carries away excess water.

closed-circuit type of operation.

#### Clean and screen

The material was conveyed from the crusher to a washing and screening setup. The material was first washed in a Diamond Iron Works rotary scrubber and then split into two sizes by a 4x10 3-deck vibrating screen equipped with spraybars. The minus 1½-inch stone dropped to one conveyor belt; the minus ¾-inch stone dropped to another belt. The inclined conveyors dropped the material into two separate overhead bins. Dump trucks then carried the material away to build the stockpile for the batch plant.

Water for all the washing and scrubbing was pumped from a nearby lake. A Fairbanks Morse 8-inch pump, driven by a Cummins 250-hp diesel, pushed the water through about 400 feet of Naylor pipe to the plant.

#### Personnel

Old reliable Milford Fred superintended the job for Hallett. After 26 years with the company, he retired upon completion of this work. He was 66 years old.

For the State Highway Department, Bob Tyson was the resident engineer for this contract. C. E. Rice supervised the field work for all four contracts.

THE END

#### IH appoints two; opens regional offices

William T. Murphy has been named staff assistant to Clarence A. Hubert, general manager of the Construction Equipment Division, International Harvester Co., Chicago. Harry T. Phelps has been appointed industrial tractor and equipment sales representative.

Four regional offices have been opened to handle engine sales operations. The Eastern region headquarters are located at 10 E. 40th St., New York City. A. W. Meyer is the North-Central regional supervisor, working out of the division's headquarters in Milwaukee Park, Ill. Southwestern regional headquarters are at 1809 S. Lamar St., Dallas, with L. E. Muzzy as regional supervisor. Headquarters for the Western region are at 2858 Cypress St., Oakland, Calif.

#### Cook, Challenge merge, elect top executives

Challenge Mfg. Co., producer of the Pacemaker truck mixer, and Cook Bros. Equipment Co., maker of heavy-duty trucks and truck equipment, have merged into one corporate group to be known as Challenge-Cook Bros. General offices for the new firm will be at 3334 San Fernando Road, Los Angeles.

J. Ross Castendyck is chairman of the board of the new organization, and Howard F. Cook is associate chairman. Joseph E. Hall is president; R. E. Swarthout, first vice president; Evan S. Prichard, vice president in charge of engineering; and D. L. Adams, vice president of the Bryan, Ohio, plant.

#### Lincoln Electric seminar to deal with structures

The Lincoln Electric Co., Cleveland, will hold a seminar on structures, April 11 to 15, at the company's headquarters.

The company holds seminars on the fundamentals of practical weld design and fabrication for machinery and structures. The two types of seminars are arranged to focus on what welded design can accomplish in improving performance and reducing costs.



# GREENVILLE'S

# BIG NEW RIPPER

FOR TD-25 TRACTOR




## REDUCE ROCK BREAKING COSTS WITH THIS BIG — TOUGH TEAM!

The BIG, brawny Greenville Rock Ripper is a perfectly balanced mate for the powerful I.H. TD-25 Tractor! Heavy-duty, strong alloy steels... "power-matched" hydraulic system... new, job-rated shanks and points combine in this new Greenville Ripper to produce unequalled performance with trouble-free operation, even to 48" penetration.

Greenville also builds "power-matched" rippers for I.H. TD-14, TD-15, TD-18, TD-20 and TD-24 tractors. Write for: Bulletin GR 25-160. Greenville Steel Car Company, Greenville, Pennsylvania.



## Management



### Job control

by **GEORGE E. DEATHERAGE, P. E.**  
construction consultant

Industrial and business management, prior to about 1875, was generally based on intuitive judgment and guess. Out of the work of a steel-company engineer, however, there developed a type of managing that has come to be known as scientific management.

Basically, it is a system designed to develop a management method suitable for any particular situation. It has four outstanding characteristics:

1. The practice of attacking all management problems as they arise by the use of every available method of fact finding, as thoroughly as time permits.
2. Maintenance of a classified record of these new-found facts, and the use of them to determine objectives and reduce recurrent tasks to routine methods, leaving only the nonrepetitive operations for special treatment.
3. Division of labor into specialized groups and coordination of their activities.
4. Fostering of a policy of cooperative relationships between groups and management.

Early in the development of scientific management the dual nature of management was recognized as a duty to the employer and a duty to the employee. Since production is hindered if labor relations are unstable, personnel management—the management of labor relations—is included within the scope of scientific management.

Since no one group of functions in departments can effectively coordinate and stabilize others on a coordinating level, it was necessary for scientific management to go to the level of general administration and develop it as the controlling agency for the entire organization.

#### Low-level decisions

Construction, unlike manufacturing industries, is still dependent on intuitive judgment to a large extent; many decisions on methods and machinery—including kinds, operation, and replacement—are left to the judgment of the superintendent. Often, the superintendent leaves these decisions to the foreman.

Contrast to this the situation in manufacturing, where careful planning precedes the selection of materials, machinery, and methods of production, and where supervisors are expected to carry out the decisions reached by the technical staff.

Ideally, the management executive should receive reports enabling him to control operations effectively. At the same time, he should be free to deal with labor matters and public relations.

The nature and size of a construction job determines the amount of detail work to be done by the superintendent or project manager, and it is impossible to establish any standards in this regard. The job may range from a 10-man operation to one employing hundreds of people.

The main control factors in any operation are those which keep progress in line with the schedule and costs in line with the estimate. If the job is on time and the work is being done at or under the estimated costs, all other factors are concerned only with continuing this operation smoothly and without friction.

With the above two major factors in mind, it is quite necessary on large work to select and define just what job reports are necessary and which ones should reach the desk of the superintendent or project manager. Once this selection has been made, it will speed operations if such reports are listed and described so that all concerned understand what is expected.

Anyone who has had the field direction of large projects will understand how easy it is to depend solely on job-control reports and to neglect personal inspection of the work from day to day. This is a dangerous oversight, as there is no substitute for getting the "feel" of a job by personal visits to all areas under construction.

For one thing, job reports cannot reflect such intangibles as the morale and cooperation of key personnel. This kind of information can be



### You just can't beat it for strength and durability

Though it's so light that two men can easily handle a 14-ft length, pipe made of corrugated, galvanized Beth-Cu-Loy sheets is as tough and strong and long-lasting as any modern project will require. With Beth-Cu-Loy pipe, you get the strength of steel, the flexibility of steel, and steel's easy-to-handle light weight.

You also get the corrosion-resistance of steel which has been alloyed with just the right amount of copper,

then coated with a heavy layer of prime Western zinc. The records show plenty of corrugated metal pipe installations which have lasted for 30, 40, even 50 years.

Because of its long lengths, Beth-Cu-Loy corrugated culvert pipe reduces the number of field joints, speeds up the laying. Large crews and heavy lifting equipment are unnecessary. The longitudinal flexibility of Beth-Cu-Loy pipe simplifies

grading and alignment; transverse flexibility helps to distribute the loads peripherally.

Bethlehem manufactures only the Beth-Cu-Loy steel sheets—your fabricator will form them into pipe to meet your project's requirements. If you would like further details about Beth-Cu-Loy sheets or the pipe made from them, consult your local fabricator, or write to us at the address below.

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Export Distributor: Bethlehem Steel Export Corporation

**BETHLEHEM STEEL**

For more facts, use Request Card at page 18 and circle No. 343





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ained only through personal contact and observation.

Daily study of all the job-control reports will quickly enable a superintendent to note the appearance of a weak spot so far as work progress and control are concerned, and to take action. An effective way to save time is to have a personal secretary check spots that appear weak or questionable.

This procedure can be followed even on the smaller jobs where no secretary is available by allocating the checking function to some key employee—field superintendent, assistant superintendent, or general foreman.

#### Staff meetings

A weekly meeting of all the staff and department heads should be held on nearly every project, including those small enough to require only three or four men. At this time, the subcontractors should be represented, as well as the owner if he is interested enough.

During these meetings, with the weekly summaries of the job-control reports at hand, the superintendent or project manager finds his best opportunity to maintain personal contacts and at the same time to discuss weak spots that have been observed through the job reports or by visits to the work site.

Such meetings help to unite all levels of management into a smooth-working team, without which no job can really be successful.

The minutes of all such meetings should be taken down and typed for later distribution to those who attended.

Regardless of the type and size of a company, it is quite necessary that an organization chart be prepared for every project. On this chart, the functions under control of specific key employees should be shown for the guidance of all concerned.

In setting up the organization chart, it must be appreciated that there are limiting factors. The greatest of these is the human factor. Supervisors are not machines that can be developed for certain functions and operated by push button; it is necessary to work with individuals and to divide their activities in accordance with their abilities.

One should study the type of organization needed and decide on a particular setup that makes possible a logical division of activities and gives excellent control. If there were no limiting factors from the human standpoint, such a plan would be easy to follow. But it may be that the men available are not qualified to allow such a division of activities.

The important factor in drawing up an organizational chart is to have all activities charted and definite functions allocated to each of the key personnel so that there is no conflict or overlapping of purposes.

Small concerns have very few or no written instructions. Even some large firms do not recognize the usefulness of the lack of a carefully worked out plan of operation directed toward a clear objective.

But the larger the concern and the more widespread its operations, the more necessary such a plan becomes to insure success. An example of this is the necessity for using the same standard methods in accounting and cost keeping when several jobs are being run under a single organization.

#### Company manuals

As far as practical, the activities of a company can be reduced to a written code, operating on the basis of "minimum exceptionalism," in

which repetitive functions are reduced to standard practices and only unusual or exceptional ones are subject to variation in accordance with job requirements.

A well managed concern may have standard instructions covering every-

thing from company policies down to rules that the employees must obey and the detailed methods to be followed in handling practically every activity. These standard instructions usually are grouped into three categories: employee manuals, which



## Nation's biggest builder of custom houses uses D 'Pulls' for ALL subdivision earthmoving

ERVIN CONSTRUCTION CO., Charlotte, North Carolina, rated as the nation's largest builder of custom homes, completes a house every 2 1/4 hours! That's quite a record... but that isn't all. The firm also handles everything related to the development of its subdivisions, including building streets, landscaping, and installation of all utilities.

Most of these jobs require a lot of earthmoving... and to help complete 'em in record time, Ervin uses two D Tournapulls®. These 9-yd LeTourneau-Westinghouse scrapers handle a wide variety of assignments—from filling-in around foundations to final grading of streets. They work in tight quarters and around obstructions that would stop other types of equipment.

#### Men on the job praise 'Pulls

Says operator Cecil S. Perkins, "This unit loads and spreads easy... and you can see either side of the pan. This is important when you're working in close quarters. And the electrical system is tops... especially the quick response you get simply by touching a switch. What's more, the D 'Pull can be driven 'cross town without need for a permit. It's fast too!"

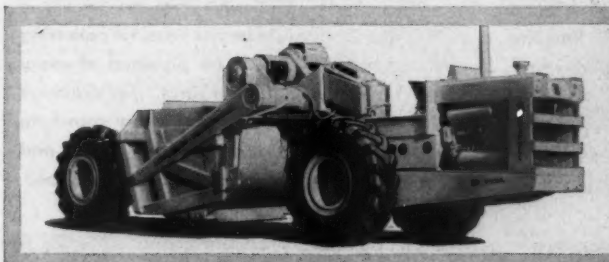
Comments operator C. C. Rhyne, "LeTourneau-Westinghouse 'Pulls are hard to beat... we use them all over these housing jobs... self-load most of the time. They're the only machines that can get around in the small areas between houses. I service and maintain this unit... it's fast and easy."

At 300-home subdivision, Ervin Construction Company's D 'Pull spreads thin layer of earth to bring street to grade. Fast, accurate spread helped maintain speed throughout cycle.



Versatile LW D Tournapull works efficiently either as a self-loader or can be push-loaded. Here, push-loaded unit hauls in big load of fill-material to level low area. Ervin's 2 'D's' helped move 200,000 yd at this housing development near Charlotte, N. C.

®Trademark DP-2184-DCI-1



#### Now better than ever

New LW D Tournapulls now have important new features including 143-hp engine... improved transmission with oil-pump and filter... and a bigger, longer-lasting clutch. These, and many other changes... plus all the proven LW speed-and-power advantages that have made the "D" top money-maker in its class... will help you earn still bigger profits. Ask for full details and arrange for a demonstration.



**LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS**

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## management

contain general information of interest to all; departmental manuals; and standard-practice procedures.

Employee manuals are used to advise employees of the rules and regulations concerning their conduct and company policy. They will cover such incidentals as absence, department, tardiness, payment of wages, transfers, travel allowances, holidays, welfare, safety, badges and passes, use of time-clock cards, etc.

Where such manuals are in force, a copy is issued to each employee. An employee then cannot say that he disregarded an important regulation because he was not advised of

it or because he misunderstood what was told him. The employee knows that he will be held accountable for the observance of the rules. He will also become more quickly adjusted to the work, because in the manual he finds the answers to matters on which he is likely to make errors.

The departmental manual generally applies to a single department only, and it serves to supplement the organization chart by detailing the work of the department and its relationship with other departments. Such a manual usually covers the following points:

1. Name of the department or division.
2. General duties of the department.
3. A concise and detailed statement

of its functions and scope.

4. Title of the department head.
5. Specific duties of the department head.
6. A list of all sections of the department.

7. A detailed description of each department section, giving its name, function, duties, title of the one in charge and his specific duties, etc.

Standard-practice procedures eliminate the solving of the same problems over and over again, many times in different ways. Busy executives, influenced by what they are doing at the moment and by the pressure of work, may make different decisions on the same matter or reverse themselves from day to day.

A method of handling an activity or function may be excellent, but un-

less a record is made and written instructions prepared to confirm it, the method may easily be forgotten or entirely disregarded the next time. Habit is strong, and there is always the tendency to slip back into old methods or bring about errors in transmission or interpretation. This can be remedied only by a study of methods and the adoption of standard rules. These standard rules are known by different names, such as standard-practice instructions, standard-practice procedures, standard orders, standing orders, and general orders.

The advantages of standard-practice instructions are that they:

1. Insure the best way to do the work and minimize the tendency to slip back into old and inefficient methods.
2. Reduce the chance of error, as the instructions are clear and definite.
3. Expose weak spots for correction while study is being made to determine the best method to use.
4. Make close estimates of costs possible.
5. Relieve the worker of much planning that is otherwise required.
6. Relieve the executive of the necessity for making repeated decisions on the same matter.
7. Serve to instruct new employees.
8. Reduce the need of supervision and provide a means of checking performance.
9. Cut costs and increase productivity.

(Next month's article will deal with "Roads and bridges: Proposals and contracts.")

### Massey-Ferguson builds

Massey-Ferguson, Inc., is erecting a 38,000-square-foot engineering building on Southfield Road, Detroit, as part of its plan to establish a world engineering headquarters in that city. The building will be near the present tractor and engineering premises, and will serve as central headquarters for engineering staffs here and abroad.

It will also be the product-engineering center for the firm's North American operations. Activities will include the basic design and development of all extensions in the company's product line for the North American market, with the exception of combines and swathers, which are engineered in Toronto.

### Motorola division news

Edward L. Falls, Jr., has been made executive assistant to the general manager of the Communications Division of Motorola, Inc., Chicago. He assumes responsibility for the continued development of the division's new-products program.

Robert N. Swift replaces Falls as vice president of Motorola Communications & Electronics, Inc., a wholly owned subsidiary of Motorola. He will manage sales and service of radio communications products in the South. Robert F. Davis succeeds Swift as vice president and manager of the midwest sales area.



## Cleveland 140 digs 38-mile Idaho gas extension

Massart Construction Company of Spokane, Wash. used a Cleveland 140 to dig a 38-mile gas line eastward from Moscow, Idaho to serve a new refractory at Boville, another brick plant at Deary and smaller users along the line. The Cleveland dug the line 40 inches deep for 4 and 6-inch pipe at a rate of better than 2 miles per day.



Typical of the entire Cleveland Trencher line, the 140 provides over 30 non-slipping digging wheel speed-and-power combinations—a choice that gives maximum trench production in all soils and terrains with greatest economy for every type and size of digging within its range.

For gas distribution and service lines, for gathering and transmission lines...for pipelines of every kind...for water and sewer lines...for drainage and irrigation systems...for every trenching requirement...for dependability, speed and economy...nothing digs trench like a Cleveland.

Check with your distributor now—get the complete story on Cleverlands



**The CLEVELAND TRENCHER Co.**

20100 St. Clair Avenue • Cleveland 17, Ohio

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## Deep cofferdam uses 100-foot-long piles

An unusual deep-water cofferdam nearing completion at Puget Sound Naval Shipyard, Bremerton, Wash., requires 100-foot-long steel sheet piles. When dewatered later this year, the cofferdam will provide a site for construction of a new carrier-repair dock.

The huge cofferdam extends about 1,200 feet and ends in about 60 feet of water. Sides of the cofferdam consist of earth dikes containing a 90-foot-deep cutoff wall of Z-type sheet piling. The end of the bulkhead consists of eleven 60-foot-diameter sheet-pile cells. The Los Angeles office of L. B. Foster Co., Pittsburgh, specially fabricated and furnished the piling on a rental basis.

Using a fleet of floating derricks, the contractor built the difficult cellular section of the cofferdam by first driving H-pile spuds to position a 18-foot-deep floating steel-frame template. Two 15-foot-high half-cell extensions were placed atop the template to provide a total of 40 feet of vertical support during setting and driving of the longest piling. On the inner side of the cells, 55-foot-long piles were used.

A Vulcan 50C hammer drove the long sheet piles to a penetration of 45 feet through fill into original ground. Cells were connected by arcs, then filled with granular material by clamshells. Dewatering was handled primarily by a series of deep-well pumps installed along the dikes.

## Malsbary names managers

Stanley Shea has been appointed district sales manager for metropolitan New York by Malsbary Mfg. Co., Oakland, Calif., producer of steam cleaners and generators. David Hanke has rejoined the company as a representative for upstate New York.

Robert J. Lorain has been promoted to manager of the newly created technical-services department. He will supervise the service department, develop application data, compile technical manuals, and act as liaison with military, state, and federal agencies.

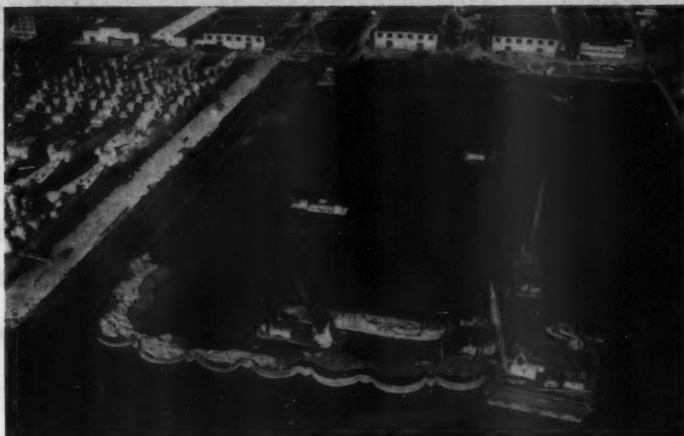
Lorain's assistant, Patrick Dunne, has been promoted to service manager.

## South Bend Division news

B. Alton Wolfe has been appointed district sales manager for the mid-Atlantic states by the South Bend Division, Curtiss-Wright Corp., South Bend, Ind. His territory includes Virginia, West Virginia, Maryland, North Carolina, and the District of Columbia.

## Euclid names manager

A. A. Bell has been appointed manager of the Minneapolis branch of Euclid Division, General Motors Corp., Cleveland. W. R. Brown replaces Bell as district representative in eastern Pennsylvania and Maryland.



A revolving crane drives 100-foot-long L. B. Foster sheet piling for a cofferdam cell at the new carrier-repair dry dock at Puget Sound Naval Shipyard, Bremerton, Wash. To build the cofferdam, the contractor first drove H-pile spuds to position a template. Two half-cell extensions were placed atop the template to provide vertical support during pile driving.

## HANDY-REACH POWER-CONTROLS

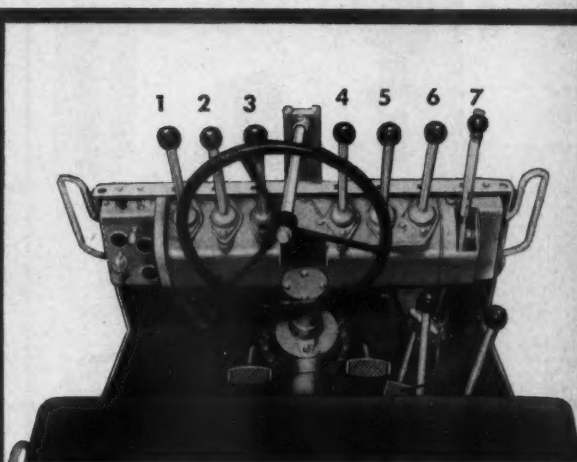
- ... increase your grader output
- ... reduce operator effort
- ... assure top efficiency

One of the main reasons you get more work done with LW graders is that they're fast, simple, and easy to operate. Controls are in "natural" locations and movement is smooth and effortless. Blade-movement speed is constant, too, regardless of the number of controls in use. Result: You cut non-productive blade-swing time... complete more grading jobs each shift.

### Most-used controls are handiest

LW grader controls are conveniently mounted in a row, with most-used levers at the ends — left and right — where your operator can quickly put his hands on them (see sketch). Next most-used controls are in the 2nd positions... easy to grasp without looking. Functions of these levers are so arranged that your operators can work 2 at a time with the same hand if needed. Thus he can frequently operate 4 levers with 2 hands... reducing length and number of manual movements.

Let us tell you about all the proven-performance advantages on LW graders that help you complete jobs faster, easier, and at lower cost. There are 7 grader sizes, 67 to 190 hp. Ask for a demonstration, no obligation.



This "handy-reach" arrangement of LW grader controls was developed after a thorough scientific study of control-lever usage. Automatic counters were placed on the control levers of various machines doing typical grader work. Each time the operator pushed or pulled a control his action was recorded and counted. The statistics thus gathered were used by LW engineers to determine the most efficient arrangement for grader controls. Result?... the fast-operating "natural" control system built into LeTourneau-Westinghouse graders.

- |   |                                |
|---|--------------------------------|
| 1. Controls left end of blade             | 5. Leans front wheels          |
| 2. Shifts blade assembly to right or left | 6. Controls right end of blade |
| 3. Revolves blade                         | 7. Hand throttle               |
| 4. Controls scarifier                     | 8. Foot accelerator            |

R. C. Leggett, "550" grader-operator for Contractor A. A. Bush Construction Co., says, "The controls are placed just right for fast, easy operating. I also like the fast speeds of this grader and the good visibility." The Laurel, Mississippi construction firm owns 5 LW graders. This one is shown spreading subbase for a sub-division street.

G-2180-DCI-1



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

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This curving wall for a new building at Brigham Young University, Provo, Utah, was only one of the forming problems for the contractor. Symons prefabs were used; compressible fillers between panel sections made outer and inner wall sections conform to the template laid at the base.

## Good forming methods push work ahead on university buildings

■ Time schedules, window blockouts, and curved walls were some of the problems facing the contractor on the administration-general services building and library for Brigham Young University at Provo, Utah.

Designed by the Salt Lake City architectural firm of Fetzer & Fetzer,

the new building posed some unusual forming work. The 4-story administration building has four wings radiating out from a central hub, with 120-degree angles north and south. The library is more conventional; two of its six stories are underground, and the structure is rectangular in shape.

Both jobs, covered by two contracts totaling \$6 million, require sizable quantities of reinforced concrete and forming. The library has more than 90,000 square feet of contact forming area in walls and about 220,000 square feet in ceilings and roof. The administration building has over 134,000 square feet of contact forming area, and about 82,000 square feet of forming in suspended slabs. Some 16,000 cubic yards of concrete is required for the buildings.

The contractor made good, economical use of about 15,000 square feet of wood forms in various places that had seen service on other projects. These prefabricated panels, most of them 2x4, 2x6, and 2x8 in size, had some roughness in their plywood facing but were still acceptable for use on such areas as basements, where backfill would hide the exterior concrete finish. In addition to these, about 5,000 square feet of Symons Steel-Ply forms were on the job.

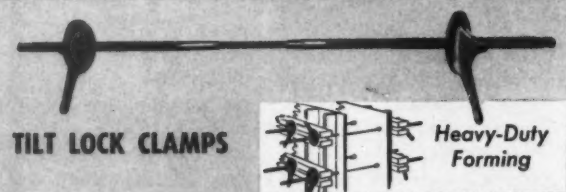
Fast forming and concrete placement took care of a big time problem that cropped up early in the job because of a necessary change in spread-footing design.

The problem of access was solved by leaving special work islands outside the building. Forms, hardware, special filler pieces, corners, tools, and materials were then staged on these work islands so that forms would be close to the setting point. This plan also saved valuable work time in the early stages of the work.

Window blockouts presented one of the main difficulties of the job. Many of these were long, covering spans up to 22 feet. No provisions had been made at the bottom sill of these windows for construction joints, but some way had to be devised to place 3-inch-slump concrete without leaving rock pockets below the sills.

The only apparent access to these wide areas was down through 12-inch columns already threaded with reinforcing rods. It was out of the question to try to get concrete into the area this way. But another way was found.

Carpenters set up forms as usual but left out scattered panels at the window locations. They then constructed a window buck of 2-inch timber to fit the opening. Small-diameter holes were drilled so that



# SUPERIOR

## One Source For All Accessories For Dependable Concrete Forming

These are examples of the numerous types of form ties, anchors, inserts, and other items in Superior's most complete line of concrete form accessories. The illustrations show the variety of concrete form work and related jobs in which Superior accessories are used. All items are designed to provide the most dependable and efficient forming methods.

**WHENEVER YOU ARE PLANNING FORM WORK...** Superior's technical assistance is available to prepare suggested layouts. Call or write to nearest address shown below.

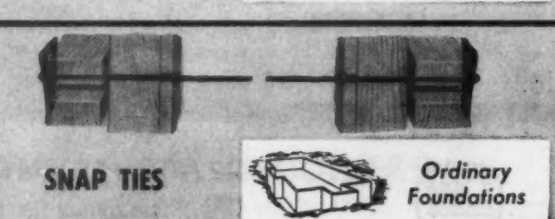
### SUPERIOR CONCRETE ACCESSORIES, INC.

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Houston 4, Texas

Pacific Coast Plant  
2100 Williams St.  
San Leandro, Calif.



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air could escape under vibration and  
front could overflow when the sec-  
tion was full. Small placing chutes  
were also built to drop through the  
Symons form openings and carry  
concrete into the area below the win-  
dow buck. Small cutouts in the win-  
dow buck form made this possible.

Despite all difficulties, work has  
been going ahead at a fast clip.  
Working with a 12-foot-high wall  
with a number of window openings,  
six carpenters and one helper formed  
12,120 feet of contact area. The job  
was done in 9 working days. In the  
same time, 168 cubic yards of con-  
crete was placed, leaving only 3,120  
square feet of forming area without  
concrete.

Use of the prefabricated forms has  
saved plenty of labor, as well as job  
time. It is estimated that a third of  
the labor usually needed in building  
and maintaining forms was saved on  
the project.

#### Air Reduction Sales opens Alabama plant

Air Reduction Sales Co. last month  
opened its new multimillion-dollar  
liquid air separation plant at Fair-  
field, Ala. The plant will produce over  
30 tons of liquid oxygen, nitrogen,  
and argon per day.

The Fairfield facility is one of two  
additional air-separation plants at  
the site. The other one, to be com-  
pleted this fall, will supply tonnage  
oxygen by pipeline to the Tennessee  
Coal & Iron Division of the United  
States Steel Corp.

#### Solar Aircraft joins I-H as subsidiary

With the exchange of Solar Air-  
craft and International Harvester  
common stock, Solar Aircraft became  
one of the Harvester group of com-  
panies. Solar Aircraft will maintain  
its corporate identity, operating as a  
subsidiary company of the Chicago  
firm.

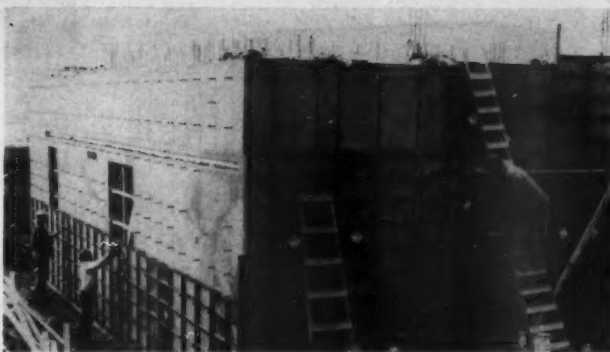
#### Field engineer named by Clark Equipment

John A. Cobb has been made a field  
engineer to work with the Michigan  
line of construction and heavy ma-  
terial-handling equipment for Clark  
Equipment Co., Benton Harbor, Mich.

Cobb, assigned to field engineering  
duties throughout the United States,  
was formerly general manager for a  
construction company, sales repre-  
sentative for a construction-machin-  
ery distributor, and a member of the  
sales-development department of a  
large construction-machinery manu-  
facturer.

#### R. G. LeTourneau news

R. G. LeTourneau, Inc., Longview,  
Texas, has appointed Lee E. Jorgenson  
to serve as direct fleet sales rep-  
resentative for the company's new  
line of earthmoving equipment. He  
will work out of the Longview office,  
serving contractors in Wisconsin, Il-  
linois, Michigan, Indiana, Ohio, Iowa,  
Minnesota, Missouri, and Nebraska.



Workmen were able to start from many points  
when it came time to strip the Symons forms on  
the Brigham Young University job. If necessary, a  
form panel can be removed from the center of  
the wall.

## Fast becoming a "must" on every spread ...to cut your tractor costs

You'll earn bigger profits on your  
earthmoving projects when your  
fleet includes a heavy-duty tractor  
that is capable of handling a *wide  
range of jobs fast, and able to work  
and travel independently.* The  
218-hp LW Tournatractor® fits  
these requirements perfectly.

This big, torque-converter-equipped,  
rubber-tired tractor has higher work-  
ing speeds (four forward to 17.2 mph,  
two reverse to 7.2 mph), to complete  
most of your tractor assignments  
faster than "track" units of compar-  
able power. There's no loss of mo-  
mentum to shift gears, because LW  
tractor's gears are constantly in  
mesh. Even reverse action is instant.  
Acceleration is fast, with 218 hp  
operating through a sealed anti-fric-  
tion drive. Maneuverability is quick  
and easy.

#### Goes anywhere

Tournatractor is *completely mobile*  
—travels anywhere under its own  
power. When moving to new work  
locations, Tournatractor saves you  
the time and expense of moving in  
extra men, extra transport equipment  
... loading, blocking, and unloading.

With an LW attachment to fit prac-  
tically any work assignment, Tourn-  
atractor keeps earning money all the  
time. Use it for fast push-loading  
... for towing scrapers ... for heavy  
dozing, or for maintenance and  
clean up. And you'll find LW trac-  
tor is a "natural" for towing sheep-  
foot rollers. With its big tires hy-  
droflated you get *bonus* compaction  
equal to a 20-ton roller.

#### Costs less to buy ...less to operate

In addition to giving you these plus  
operating advantages, Tournatractor  
costs less to buy, less to operate  
than track-type tractors of compar-  
able size and horsepower. Before  
you buy any tractor, investigate this  
dependable LW "cost-cutter". We'll  
be glad to demonstrate.

CT-2290-DC-1



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# Digging-drilling balance means optimum production

Excavation of more than 18,000 cubic yards of rock and earth daily is average for Gasparini Excavating Co., Inc., Peckville, Pa., the contractor on three adjacent sections of the Penn-Can Highway north of Scranton, Pa. The three contracts, totaling \$6,340,765, include the grading of almost 10 miles of roadway. Total excavation comes to 2½ million yards.

## Plenty of rock

Over 900,000 yards of the excavation is rock, with cuts going as deep as 60 feet. The contractor, backed up with many years' experience in mine-stripping operations, is handling the rock drilling with a small compact spread working two 8-hour shifts. Removal of the blasted rock is handled by a large powerful excavation-hauling fleet that works only a single 8-hour shift, during which it moves over 18,000 yards of material.

The drilling units are a pair of Ingersoll-Rand Crawl-IR track drills, powered by Ingersoll-Rand 600-cfm compressors. They sink 3½-inch-diameter blast holes that are driven within a 9×9-foot drill pattern with 10-foot drill steel and carbide-insert bits. Most of the rock outcrops are being blasted in single lifts not exceeding 35 feet.

Dry blast holes are loaded with Du Pont Nilite and wet holes with Du Pont Hi-Cap explosives—both primed with Du Pont 40 per cent special gel. Gasparini is averaging a cubic yard of blasted rock per 0.9 pounds of Nilite and a cubic yard for every 0.75 pounds of Hi-Cap used.

A new truck-mounted Portadrill, manufactured by the Winter-Weiss Co., Denver, Colo., is also being used to sink 6-inch-diameter holes 20 feet deep in a 15×15-foot drill pattern. This drill is powered by an Allis-Chalmers 2-phase compressor driven by a General Motors diesel.

These holes are loaded with Du Pont Nilite, which is primed with a charge of special gel at the bottom and at an intermediate elevation in the hole. Both of the primer charges are capped to assure detonation.

## Hauling fleet

Gasparini is using three diesel shovels—a P&H and 2 Marion 111-M's—together with four other Marion and Lorain rigs and 2 to 3-yard buckets to keep the big hauling fleet moving. This fleet is made up of ten Euclid 46-TD 15-yard rear-dumps, 16 smaller Euclid rear-dumps, and a few Mack trucks.

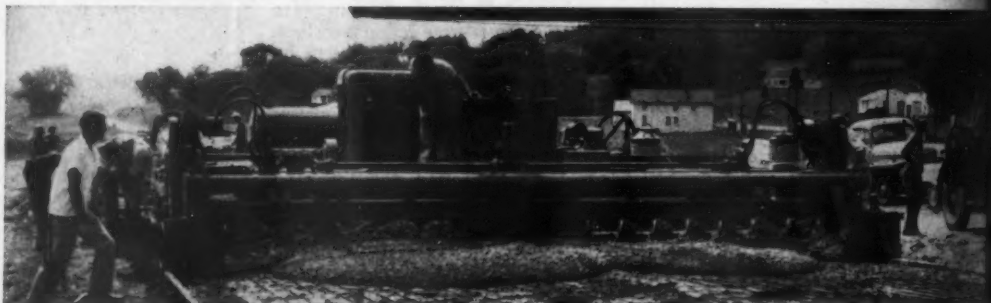
Four scrapers—two Cat DW21's and two LeTourneau-Westinghouse Model B's—are handling some of the earth

One of the three drills working on rock cuts in the 3-contract section of the Penn-Can Highway near Scranton, Pa., is a Portadrill powered by an Allis-Chalmers compressor. Made by Winter-Weiss Co., Denver, the truck-mounted rig sinks 6-inch holes 20 feet deep on a 15×15-foot pattern.



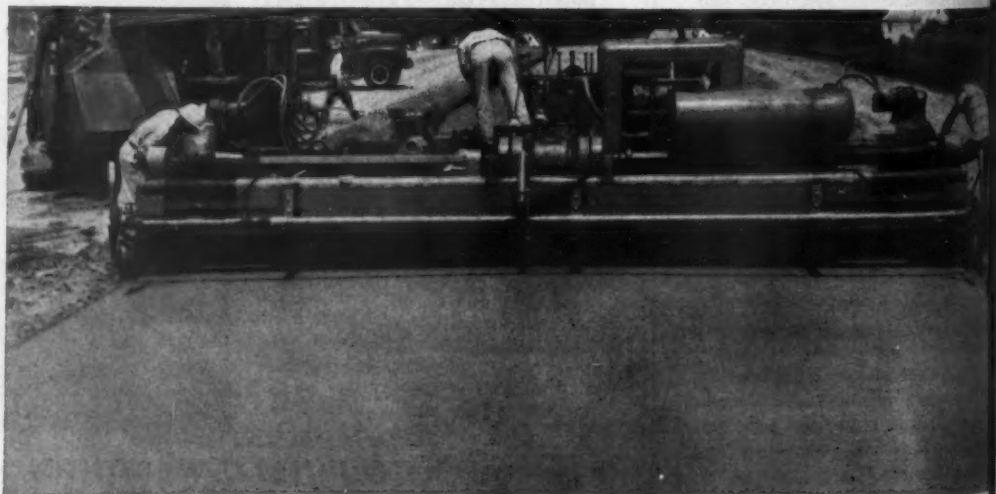
**1** **HYDRAULIC SPREADING SCREWS**, controlled by light-touch levers, remix as they spread to form a denser, stronger, uniformly-textured slab. Eliminate segregation and honeycomb. Right and left screws can be

started, stopped or reversed independently. Operation screws, and lifting and lowering of screws, strike-off screed, are controlled with perfect ease and smooth hydraulic operation. Jaeger originated screw spreading



**2** **PLACEMENT OF A SECOND COURSE** is easily handled by the same spreader-finisher if only one paver is used. With two or three pavers, top-speed continuous

progress is maintained by adding a Jaeger spreader to p and strike-off the base course and following with spreader-finisher on top course after mesh has been



**3** **BEHIND THE SPREADER. LOOK AT THE IDEAL SURFACE** THE FINISHER WILL WORK ON: One man, on Jaeger spreader-finisher, not only does the spreading but

also finishes an accurately metered surface ahead of finishing machine. Metering here reveals any excess deficiency of material where it is easy to correct.





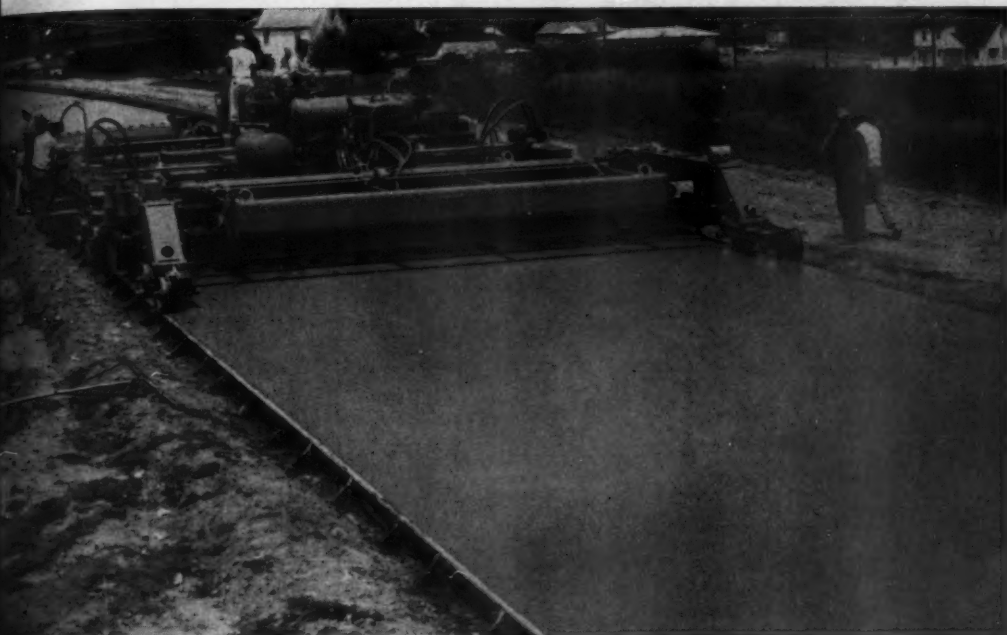
An Ingersoll-Rand Crawl-IR—one of a pair—puts down 1 1/2-inch blast holes 35 feet into a 60-foot rock cut. Holes are on a 9x9-foot pattern. Power is supplied by an I-R 600-cfm compressor.



Blasted rock destined for use as roadway fill is loaded to a Euclid rear-dump by an electrically operated Marion 111-M with 6-yard bucket. Working an 8-hour shift, the rigs move more than 18,000 yards daily.



A Mack 15-yard rear-dump delivers its load of blasted rock to the fill. A tractor-dozzer will spread the material in maximum 2-foot lifts. Earth is spread in maximum layers of 9 inches.



**FINAL FINISHED SURFACE IS AN ENGINEER'S DREAM:** Towed by a Jaeger tandem screed finisher and controlled by the same operator, the Jaeger finisher-float gives the final 4-to-1 correction of any surface

inaccuracies. It rides on bogie axles. Its oscillating screed and float pan are both suspended, independent of form levels alongside. (You can also use this float-finisher behind any make of finishing machine. Detaches in 2 minutes).

## HOW 2 MEN LAY SUPER-SMOOTH PAVEMENT WITH JAEGER 4-SCREED TEAM

One spreads and finishes, the other finishes and floats. For 2-course work, simply add a base spreader.

By using Jaeger's integrated paving train, low-bid contractors are saving labor all along the line—and delighting highway inspectors with the

smoothness of their finished slab. On single-course work, here diagrammed, one spreader operator does the spreading, strike off and first finishing pass with oscillating screed—all in the one

pass. On 2-course pavement, if you are using only one paver, the same machine also spreads, but does not screed, the base for reinforcing mesh. For fast, 2-paver production of 2-course slab, you need only add another spreader, without a finishing screed, to lay the base.

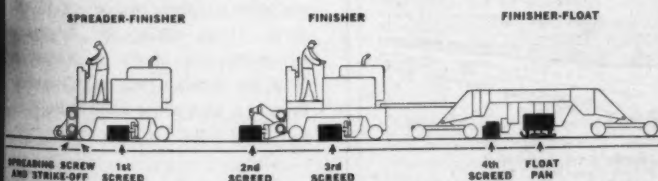
any finisher. It imparts the final kiss-finish with its narrow oscillating screed and 30" wide float pan.

### MACHINE-PERFECT, READY FOR BURLAP

Both the screed and pan of the finisher-float are suspended, independent of adjacent form level and its bogie axles provide a 4-to-1 ratio of correction. The accuracy of finish being obtained with this equipment is typically described by a leading highway engineer as "the smoothest pavement I have ever seen."

### COMPLETE DATA ON REQUEST

Hydraulic control, quick-crown-change and width adjustability (hydraulic self-widening where desired), diagonally adjustable finishing screed and many other valuable Jaeger features are described in latest catalog. Ask your Jaeger distributor—or write us.



smoothness of their finished slab. On single-course work, here diagrammed, one spreader operator does the spreading, strike off and first finishing pass with oscillating screed—all in the one

pass. Only one more machine operator is needed behind. He controls both the Jaeger tandem screed finisher and the Jaeger finisher-float. This last machine can be towed by, and operated from,

**THE JAEGER MACHINE CO., 701 Dublin Avenue, Columbus 16, Ohio**  
JAEGER MACHINE CO. OF CANADA, LTD., ST. THOMAS, ONTARIO

For more facts, use Request Card at page 18 and circle No. 349

excavation along with the shovel fleet. Eight D8's and three D7 tractor-dozers are spreading this excavated material into the fill areas. Blasted rock used in the fills is spread in maximum 2-foot lifts, while the earth fills are spread in maximum 9-inch layers.

A Caterpillar D9 and an Allis-Chalmers HD-21 tractor handle push-loading. The fill areas are being compacted by three Gallion 10 to 12-ton rollers and two Huber 10 to 12-ton rollers. The earth fills are being compacted by a Buffalo-Springfield Kom-pactor.

The 45-mile \$35 million Penn-Can Highway is being constructed as a federal interstate route between the northern terminus of the Northeast Extension of the Pennsylvania Turnpike near Scranton and the New York State line near Binghamton. When completed by 1961, the new road will have two 24-foot reinforced-concrete roadways separated by a 60-foot-wide earth median.

### Personnel

Leo Nolfi is the project manager on all three contract sections for Gasparini. John Dembroski and Paul Lach are the superintendents on the various sections. John Woloschuk, Joseph Jendrewski, and Harry Brown are the resident engineers on the separate contracts for the Pennsylvania Department of Highways.

THE END

### York Modern names

■ William H. Otis has been named sales manager of York Modern Corp., Unadilla, N. Y. His duties will include developing and broadening the system of distribution outlets for York rakes.

### Trailmobile expands

■ A new branch office has been opened at 88 O'Kell St., South Buffalo, N. Y., by Trailmobile Inc., Cincinnati. Branch manager is V. U. Olive.

The branch has 15 trailer service bays, a paint booth, wash rack, and 5-acre parking area. It carries more than \$100,000 worth of new and used trailers.





Workers join the top sections of one of the Armco Multi-Plate pipes for a General Electric testing facility for turbo-prop engines. Use of the 120-foot-long 24-foot-diameter cells eliminated the expense of heavy foundations that would have been required for another type of building.

For more facts on insert, circle No. 350

### Structural-plate pipe forms engine test chamber

■ A composite-type structure, with the basic structural frame composed of Armco Multi-Plate pipe, is being used for testing turbo-prop engines. It provides safety for operating personnel, versatility in engine testing, meets aerodynamic requirements, and is of simple construction. These specifications were met by designers of the engineering testing laboratory of the small-aircraft engine department of General Electric Co., Lynchburg, Va.

The pipe serves as the chamber in which turbo-prop aircraft engines are tested. The engines are suspended from a structural-steel frame that forms a chord within the pipe. The exterior surface of the pipe is covered with reinforcing steel and a layer of pneumatically applied mortar. These elements provide the required wall thickness and suppress transmission of sound, while they help to confine fragments in case of engine failure.

The over-all test facility consists of two of the engine test cells of structural-plate pipe. These cylindrical structures are connected to a building between them that serves as a control room. The entire facility is in the form of an H.

Each engine test cell measures 120 feet long and 24 feet in diameter. All cutouts necessary for the passage of pipes, installation of lighting fixtures, doors, and observation windows were made immediately after erection and alignment of the pipe were completed. This type of structure made it possible to eliminate the expense of heavy foundations that would have been needed if another kind of building had been used.

## MUSCLES under the mainline!

### Rodgers Hydraulic Jacks

**push three 88 foot tiles under railroad without disrupting traffic**

Two 200 Ton Rodgers Hydraulic Jacks were selected by W. J. Irwin & Sons, Inc., Tonawanda, N. Y. for driving three sewer pipes of 96" I. D. reinforced concrete tile 88' under the mainline of the New York Central Railroad. Part of a 2½ million dollar sewer contract on the Tonawanda West Side Drainage Project, the "push pipe" method was preferred because it permitted unrestricted use of the rail right-of-way overhead.

**TIME: 34 DAYS**—Actual jacking time consumed 34 days based on three-eight hour shifts a day. Each sewer took eleven 8-foot tile sections. The *First Line* required 14 days; the *Second Line* 11 days and the *Third* only 9 days.



**JACKING PROCEDURE**—A service pit 28' deep by 22' wide by 40' long was excavated to house the jacking equipment. A pair of 75 lb. steel rails placed on the concrete pit floor cradled the tile sections and acted as a guide for the jacking operation. Type of soil encountered in all three pipes was a mixture of heavy yellow and blue clay.

**EQUIPMENT USED**—Two 200 Ton Rodgers Hydraulic Jacks with 48" ram travel were powered by a Rodgers Model D2 electric driven hydraulic pump located at the top of the excavation pit. A valve panel located at the bottom of the pit permitted accurate control of the jacking operation.



↑ Steel rails cradle tile sections as twin Rodgers Jacking Cylinders press against the wooden jacking frame. Heavy grease on outside of tile cuts down friction—for easier sliding.

← Rear of excavation pit showing Hydraulic Jack against abutment wall. At this stage the ram is extended approximately 1/5 of the 48" ram travel.

**ADVANTAGES OF HYDRAULIC JACKING**—This job was handled at low cost and was unique due to the short time required for completion and the fact that rail service overhead continued uninterrupted throughout the tunneling project below. Entirely different from conventional tunneling, the "push pipe" method also provides greater safety to workers from cave-ins since they work inside the tile that is being driven.

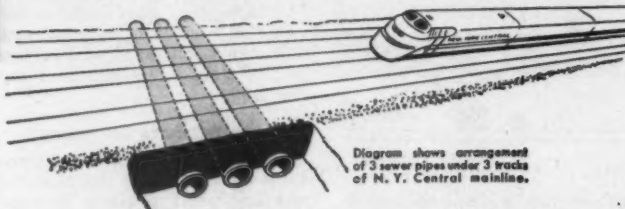


Diagram shows arrangement of 3 sewer pipes under 3 tracks of N.Y. Central mainline.

If you'd like more details about this job, write for free copy of Bulletin 331.

## Rodgers Hydraulic Inc.

7415 Walker St. • Minneapolis 16, Minnesota



For more facts, use Request Card at page 18 and circle No. 350

### Kwik-Mix promotes

■ Walter Lay has been promoted to sales-engineering consultant, and Richard Henry to sales manager of the Ka-Mo Tools Department of Kwik-Mix Co., division of Koehring Co., Port Washington, Wis.

Lay will be responsible for sales engineering and field investigations of new or special product applications. He will also aid in sales training and merchandising programs and in new-product development. Henry will be responsible for sales promotion, sales training, distributor assignments, and all other problems pertaining to sales work.

### American Pulley assigns

■ The American Pulley Co., Philadelphia, has appointed James W. Wayland its southwestern representative for both power-transmission and material-handling equipment. He will serve Texas, Oklahoma, Louisiana, Arkansas, and parts of Mississippi from the firm's newly established offices and warehouse at 2110 Farrington St., Dallas.

### Soiltest forms subsidiary

■ Soiltest, Inc., Chicago, has established a subsidiary, Soiltest International S. A. of Lausanne, Switzerland. The new firm will direct sales and distribution for the company's European, African, and Middle Eastern markets.

CONTRACTORS AND ENGINEERS



circle No. 1

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## PRODUCT LEADERSHIP IN ACTION ...CURTISS-WRIGHT EARTHMOVERS

Leadership proven in the field is the ONLY kind that is important to your job profits. We mean leadership based on TODAY'S performance, not leadership based on YESTERDAY'S tradition. In these days of tight bidding, you can not afford selection of a machine based on the performance of obsolete models. It takes comparative evaluation of cycle times, bowl factors — production proven under today's new performance standards. That is where your profits lie — and that is where Curtiss-Wright proves its product leadership.

SOUTH BEND DIVISION  
**CURTISS-WRIGHT CORPORATION**  
SOUTH BEND, INDIANA

Distributed in Canada by Canadian Curtiss-Wright Ltd.

**TURN PAGE**

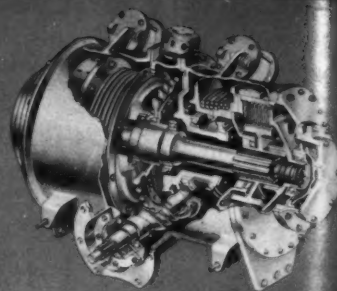


## BOWL FACTORS— Check Them Before You Buy!

A bowl factor is the ratio between the rated capacity of a scraper and the amount of material it actually carries. For example: a 20 cu. yd. struck capacity scraper averaging 15 pay yds. per load would have a bowl factor of .75 or 75%

$$\left[ \frac{15 \text{ Actual Pay yards}}{20 \text{ Struck yardage cap.}} = .75 \right]$$

To move the most material with the least cost, you need the scraper that has the greatest bowl factor. Looks are deceiving — and the scraper that looks full may not be full at all because of swell — the difference in the density of the material in the scraper versus the material in the bank. In other words, the loaded material will contain voids, due to two major factors 1) the type of material and 2) the lack of bowl efficiency. When the scraper's performance is being evaluated the bank weight of the material must be divided into the weight of the load to obtain the pay yards. These pay yards divided by the rated struck capacity equals the bowl factor. Therefore a scraper must have a high bowl efficiency to provide the greatest bowl factor which is the key to pay yards — your actual measure of production. Check Curtiss-Wright's high bowl efficiencies.



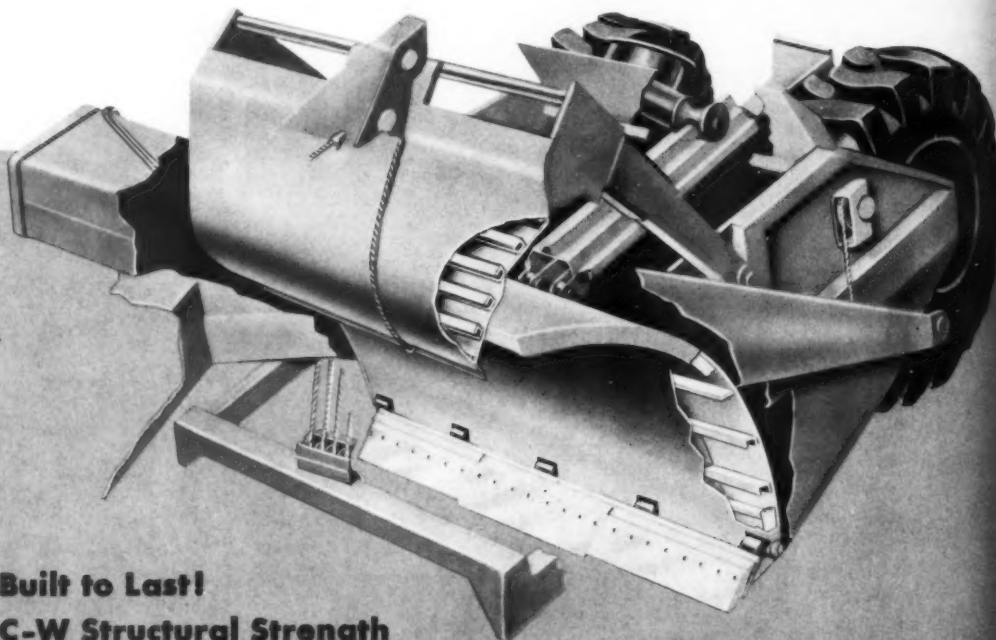
### CONSTANT "LIVE" POWER CONTROL UNIT

The main features of the Curtiss-Wright "live" Power Control Unit are:

(1) The "live" power control unit provides complete control of each operation at all times — giving you better control and faster cycles than with other type units.

(2) The method used by Curtiss-Wright to provide a "live" power control unit made it possible to locate it for maximum efficiency. No compromise was necessary, as with other units, which must be positioned near the transmission.

For a real endorsement of the "live" power control unit, ask any C-W scraper operator. His answer will be emphatic . . . The best power control system available — another Curtiss-Wright performance feature.



**Built to Last!**  
**C-W Structural Strength**  
**Assures Longer Machine Life**



FREE . . . An attractive binder for the complete C-W Job Information series is available from your Curtiss-Wright distributor. Ask for it!

There is no time to "baby" equipment on today's tightly run jobs. Every unit must be built to take a brutal succession of strain, stress, weight and wear. Designing a machine that will hold up under this punishment involves not only metal thickness, but also complex internal structural reinforcement based on an analysis of stresses encountered under the most extreme operating conditions. Your Curtiss-Wright distributor will be glad to show you, point by point, why C-W scrapers stand up to the pounding of a tough job better than any other scraper on the market.



## Buy a wheel-type loader to fit your job needs

Analysis of the many wheel loaders on the market shows that it is difficult to label one machine better than another, merely because of this feature or that component. The real cost of owning a machine comes down to the total of initial purchase price, cost of repairs, and value of production lost during downtime, minus the trade-in value. A machine that cannot do the job required is the most expensive at any price.

A purchaser seeking the optimum balance of productivity and durability that serves his individual needs must look beyond the specification sheet to the on-the-job performance of each available unit. Selection of a wheel loader should be based on the production required, the machine's productive ability, the purchase price in relation to quality of the machine, parts and service availability, and approximate trade-in value.

Production requirements can be plotted on graphs in terms of yards, tons, or number of trucks per hour or per day. Loader specifications vary with manufacturers—each has a different definition for many rating conditions—but they are of some help in determining the capacity of a machine. Loader components are rated by bucket capacity, bucket operating speed, and lifting capacity; chassis components by engine power rating, physical size and weight, and work and travel speeds.

Most manufacturers rate bucket capacity by Society of Automotive Engineers recommended practices. This is a heaped rating and is a good measure of the average amount of material obtained in the bucket for the average of many types of materials by reasonably competent operators.

Lifting capacity is a scientific measure of machine limitation and is normally expressed as a curve of capacity at various bucket heights.

Bucket operating speeds are important because sluggishness or undercapacity limits total machine productivity. Bucket reach varies from model to model and can be critical for efficient loading into the center of truck beds. Bucket dumping height is important: If the bucket in dump position will clear the side of the truck, cycle times should be faster because operators do not have to raise the bucket before backing away.

With naturally aspirated engines, especially gasoline models, cubic-inch piston displacement is a reliable indication of an engine's ability to deliver a certain amount of power through a reasonably long service life. With turbocharged engines, particularly diesels, piston displacement is not a good yardstick. Here, the manufacturer is obliged to rate horsepower, balancing power output against economically long total engine life. With this in mind, the po-

tential owner of a loader with either type of engine should compare working performance and productivity of each machine against an estimate of engine durability and operating cost based on experience or the manufacturer's reputation.

Gasoline engines may be lower priced, their workings may be better understood by mechanics, and their fuel more readily available. Diesel engines have better lugging ability, require few operating adjustments, op-

erate on low-cost fuel, often operate more hours between overhauls, and often have a longer life. They pay their way on heavy, continuous jobs.

True machine size is best determined by studying physical size and weight, since these affect operating stability and contribute more to wheel-loader productivity.

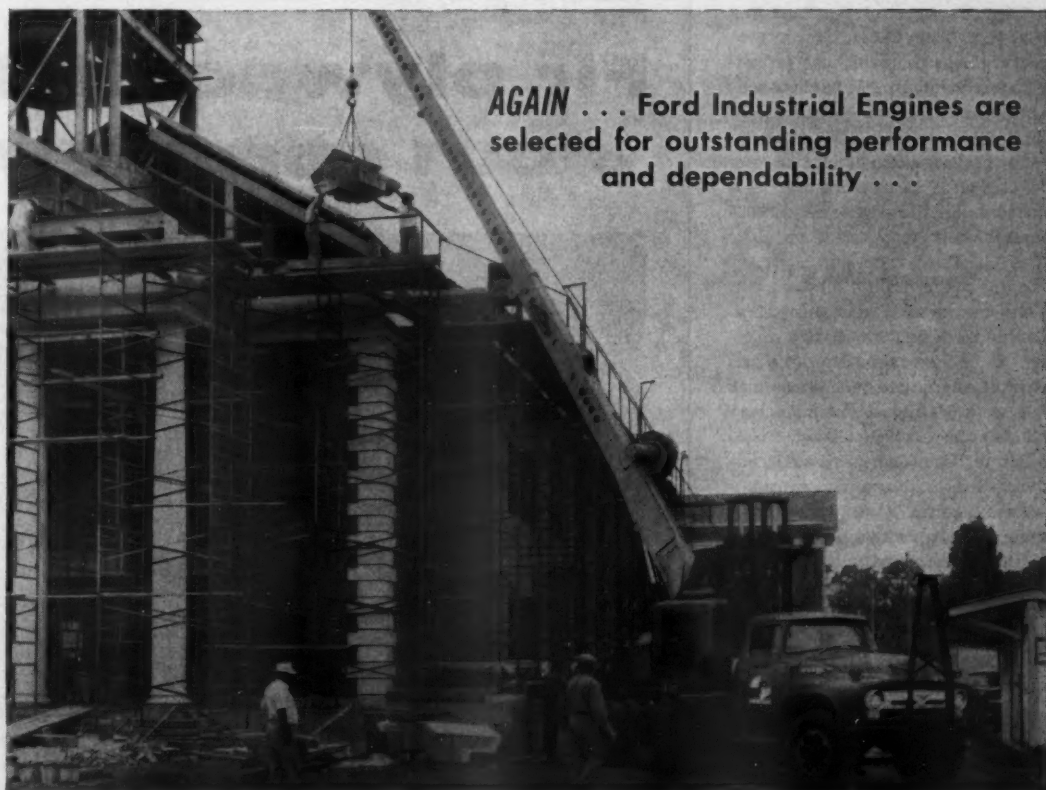
Higher effective working speeds, bucket loads, and production often result from more safety and comfort for the operator. Lift-mechanism components located ahead of the operator's compartment eliminate danger from links, arms, and cylinders passing at the sides of the operator, and such design allows access to the seat by means of steps. Fenders eliminate danger from rocks and dirt kicked up by the tires. Buckets with

a long reach are less likely to spill material on the operator.

Roadability and operating stability should be checked before purchase. The real top speed of a unit at work or in travel is the speed at which it can be operated safely.

### Raymond names manager

James J. Mennis has been named southeast-area manager of the heavy-construction division of Raymond International Inc., New York City. He will operate from the New Orleans office and will supervise sales and installation of the company's line of prestressed products, particularly cylinder piles for highway, port, and offshore structures such as radar and drilling platforms.



**AGAIN . . . Ford Industrial Engines are selected for outstanding performance and dependability . . .**

## Versatile Ford-powered Hydrocrane provides 70 feet of lift with its "boardinghouse reach"

Meet the smooth-working Bucyrus-Erie H-5 Hydrocrane which features a hydraulically telescoping boom that allows you to "inch" 12-ton loads under wires, limbs and through apertures with precision control. Just as Ford power contributes to the effectiveness of the H-5, it can bring a new kind of efficiency to your equipment. Here's why:

**DURABILITY AND ECONOMY . . .** Ford's Short Stroke design and Deep-Block construction cut friction, vibration and wear. Overhead valves permit higher compression ratios, greater power output and make servicing easier, quicker and less costly.

**COMPACTNESS . . .** Thanks to Ford's space-saving design and advanced engineering features, all Ford engines now develop more power per pound of engine weight than ever before possible.

### FORD POWER IS RIGHT FOR YOUR CONSTRUCTION EQUIPMENT, TOO!

INDUSTRIAL ENGINE DEPARTMENT, FORD DIVISION, FORD MOTOR CO., P.O. BOX 598, DEARBORN, MICH.

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→ FORD INDUSTRIAL ENGINE DEPT., P.O. BOX 6787, LOS ANGELES 22, CALIF.

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**PARTS AND SERVICE . . .** With more than 10,000 Ford Dealerships in the U.S. alone, you can get prompt, efficient service wherever your job takes you.

So, to keep your profits up . . . your operating costs down, power or repower your construction equipment with a dependable Ford Industrial Engine—available from 134 to 534 cubic inches, including two economical diesels.



**More power to you . . .**

**Ford**  
INDUSTRIAL ENGINES  
AND POWER UNITS

For more facts, use Request Card at page 18 and circle No. 352



## Scrapers and shovels team for grading job

Earth excavation for a section of the Penn-Can Highway, that extends from Scranton, Pa., to northern New York State, is being handled by shovel and haul units, as well as scrapers. This Euclid rear-dump is discharging in a fill area, and the Cat D9 tractor-deer is spreading the material in 1-foot lifts.



A neat, clean, and efficient grading job is now in progress just south of Binghamton, N. Y., as Triple Cities Construction Co., Binghamton, shapes a 2.5-mile section of the Penn-Can Highway. This \$1,651,000 contract, part of the new superhighway extending from Scranton, Pa., to the Thousand Islands region in northern New York State, requires 1,500,000 cubic yards of excavation, including over 300,000 yards of rock removal. Also included in this figure is 500,000 yards of borrow.

### Scrapers and shovels

The contractor is using a combination of track and rubber-tire scrapers, as well as shovels, for the two types of excavation. Most of the rock was removed from a single cut over 100 feet deep, which allowed Triple Cities to begin operations and continue them in the winter months.

Two Ingersoll-Rand wagon drills were used during this phase to sink 1½-inch blast holes in 12-foot lifts. Holes were driven on an 8×8-foot drill pattern and blasted with American Cyanamid dynamite. The cut was blasted in three sequences across its width, with each sequence having about 150 to 170 holes per shot.

Triple Cities then brought in two Northwest 80-D shovels equipped with 2½-yard buckets to load the blasted rock. Eight Euclid 12-yard rear-dumps, handling 3,500 to 4,000 cubic yards of rock per 8-hour day, hauled this material to the various fill areas along the project. The rock was placed in maximum 2-foot lifts and compacted with two Buffalo-Springfield 10 to 15-ton 3-wheel steel rollers.



One of the rigs in the fleet of Euclid S-18 scrapers works on the roadway excavation. A D9 assists in push-loading.

## Fir plywood helps solve problem on giant

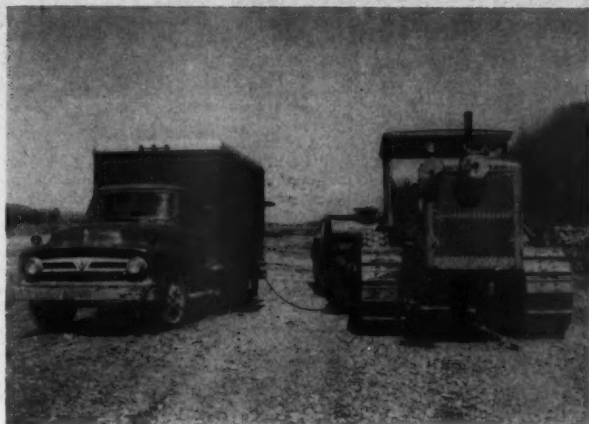


SCIOTO DOWNS RACE TRACK  
LOCATION: Columbus, Ohio  
ARCHITECTS: Kellam & Foley, Columbus  
STRUCTURAL ENGINEERS:  
Gensert, Williams & Associates, Cleveland  
CONTRACTOR: Shest Construction Co., Columbus



A Cat 80 scraper pulled by a D8 dumps a load of earth fill that is compacted by a Bros 50-ton pneumatic roller. In all, 1,500,000 yards of excavation is required for this 2.5-mile section of the highway.

Lubrication is a steady job for the maintenance crew. This Lincoln lubrication van on a Ford truck stops a Cat pull-type scraper for greasing. The enclosed van has six reels for dispensing motor and transmission oils, chassis grease, track-roll grease, hydraulic oil, and air.



## Complex forming for concrete umbrella roofs

PLYWOOD'S UNIQUE ADAPTABILITY as concrete form material simplified a complicated roof construction job at the Scioto Downs race track, Columbus, Ohio. At the same time, plywood created smooth concrete surfaces and kept costs low.

The striking grandstand roof is a series of huge hyperbolic-paraboloid concrete shells. Each 61 x 116-ft. section is supported by a 44-ft. column. The clubhouse and offices have thin-shell concrete folded plate roofs.

Plywood was shaped so easily to the complex curvatures of the grandstand roof, and made such tight joints, that the contractors found it needed no liner. Original specifications had been for lumber or plywood backing faced with hardboard for surface smoothness. But a single layer of 3/4" plywood to do both jobs resulted in a smooth, fin-free concrete surface, besides eliminating the labor and material cost of applying liner.

More savings came from plywood's ease of handling, which the contractors called a real cost cutter. And rate of re-use was exceptionally high. Panels stripped from the grandstand roof were used on the folded plates and were still good for many more times. There was only a four percent loss out of 10,000 sq. ft. of plywood.

### DOUGLAS FIR PLYWOOD ASSOCIATION

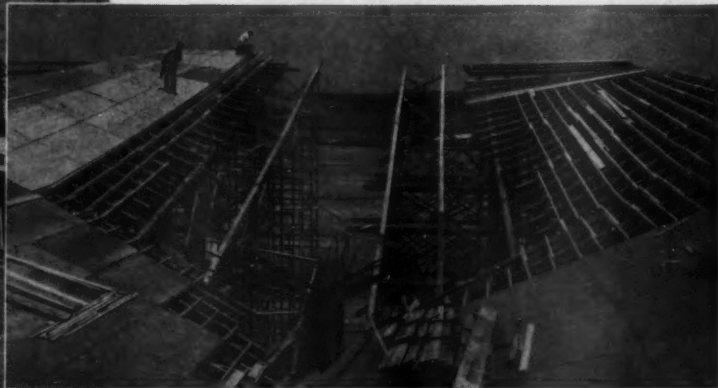
TACOMA 2, WASHINGTON

—a non-profit industry organization devoted to research, promotion and quality control



### ALWAYS SPECIFY DFPA-QUALITY TRADEMARKED PLYWOOD.

Concrete form grades include: INTERIOR PLYFORM®—made with moisture-resistant glue, gives up to 10-12 re-uses; EXTERIOR PLYFORM®—waterproof glue, gives up to 25 or more re-uses; OVERLaid EXTERIOR PLYWOOD—premium panel, forms smoothest concrete, gives up to 200 re-uses.



Grandstand roof forms were of 3/4" fir plywood over a grid of 2x4's and 2x6's. Panels adapted readily to required curves, yet joints were tight and final concrete surface was smooth and even. Office building behind grandstand and clubhouse at side have continuous folded plate concrete roofs. They were formed against plywood panels previously used on grandstand roof.

For more facts, use Request Card at page 18 and circle No. 553

When earth excavation began, the contractor teamed the shovels with a fleet of scrapers and belly-dumps. Three Cat D8 tractors handled the pulling of Cat pull-type No. 80 scrapers. These 20-yard units were required to shape a 75-foot-deep side-hill cut. A D9 tractor assisted the rigs by push-loading.

The remaining earth excavation, including the 500,000 yards of borrow, is being done by six Euclid S-18 scrapers and the two NW shovels with the eight rear and three bottom-dump Euclids. With all these units in operation, and with an 11,000-foot haul for the borrow material, the contractor has been averaging between 10,000 to 12,000 cubic yards per 8-hour day.

All earth fills are spread to maximum 1-foot lifts by a half-dozen Cat D8 dozers and compacted by a Le-Tourneau-Westinghouse sheepsfoot roller and a Bros 50-ton pneumatic roller that is pulled by D8's. The maximum compaction is 95 per cent of maximum Proctor.

### Maintenance

Being located so close to Binghamton, the contractor is able to bring any equipment requiring major repairs to the main headquarters' shop.

In the field, a Lincoln lubrication van mounted on a Ford truck roams the project, catching a scraper rolling by or a tractor not active at the moment and—if necessary—stopping a rig for lubrication. The enclosed van is equipped with six Lincoln reels that provide motor oil, transmission oil, chassis grease, track-roll grease, hydraulic oil, and air. Compressed air for the reels is furnished by a Quincy compressor driven by a Wisconsin gasoline engine. The contractor is using D-A lubricants, which are transferred to van storage barrels by an air pump.

The project, scheduled for completion by fall, does not include the concrete paving of the two 24-foot roadways. This will be done under a separate contract.

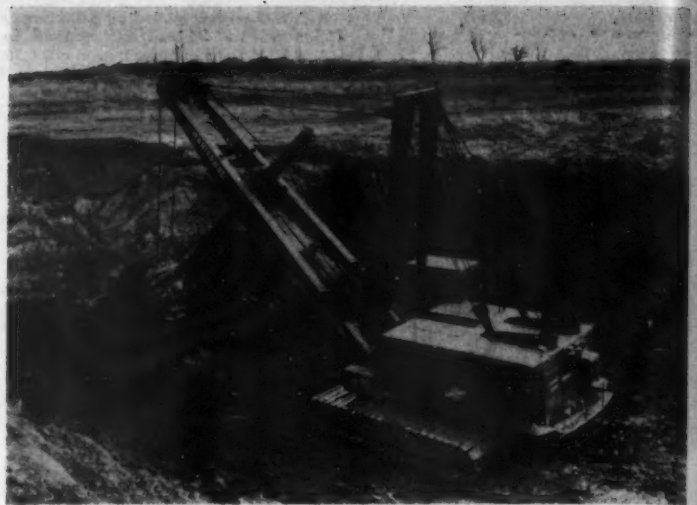
### Personnel

Jack Impero is the superintendent for Triple Cities, and Joseph C. Frederick is the district engineer for the New York Department of Public Works.

THE END



CLAY OVERBURDEN is removed by a new Manitowac Model 4500 Vicon at a strip mine near Millersburg, Ohio. Approximately 600 cubic yards is removed hourly; the job calls for removing 20 to 30 feet of overburden in order to reach a 3 to 4-foot coal vein. The shovel does not use conventional engine throttles; each clutch control lever in the pilot house is also a throttle. It employs two independent diesel engines—one for swing, travel, and boom-hoist functions and one for the drums.



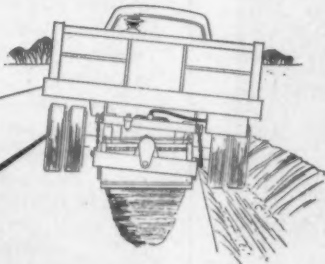
**M**ARTIN

## Tiltable Patcher

Retractable, tiltable patcher exerts 3½ tons of compaction pressure, automatically adjusts to road contour regardless of position of truck wheels. Here's the perfect road patcher! It is attached under the truck frame and can be lowered to roll a smooth patch any time, anywhere. It produces a smoother patch much faster than hand tamping and eliminates the need for a conventional roller. It doesn't interfere with normal truck operation. Hydraulically exerts 3½ tons of compaction pressure, yet adds only 700 lbs. of weight to the truck. Costs thousands of dollars less than similar capacity conventional roller. It's raised and lowered by an electrically-operated hydraulic pump. Two spring-loaded scraper blades and a built-in sprinkler system keep asphalt from sticking to the roller.

FEATURING  
EXCLUSIVE  
TILTING DESIGN

Tiltable patcher pivots at the center to exert a uniform, controlled compaction pressure across the entire rolling surface, regardless of road contour!



**M**ARTIN COMPANY

progress through Research • Design • Engineering

620 Andrews Ave. • Kewanee, Illinois  
P.O. Box 187 • Phone 4234 • Cable MARCOMY

For more facts, circle No. 354

### L-W representatives

■ Maurice Hellman has been appointed a district representative for LeTourneau-Westinghouse Co., Peoria, Ill. He will serve Utah, Colorado, and Wyoming except for several counties in the northeast and upper central regions of the state. Hellman replaces Rudy Zibert, who has opened his own L-W distributorship in Cheyenne, Wyo.

Robert Paustian succeeds Hellman as assistant to the western sales manager.

### American Cyanamid closes explosives plant

■ The Grafton, Ill., industrial explosives manufacturing plant of American Cyanamid Co., New York City, has been closed. Operation of the plant proved uneconomical in view of the technological changes in the explosives market.

### Stenberg appoints

■ Hessel H. Holland has been appointed district representative for Stenberg Mfg. Corp., Hoosick Falls, N. Y. He will cover North and South Carolina, Georgia, Florida, Alabama, Mississippi, and Tennessee.

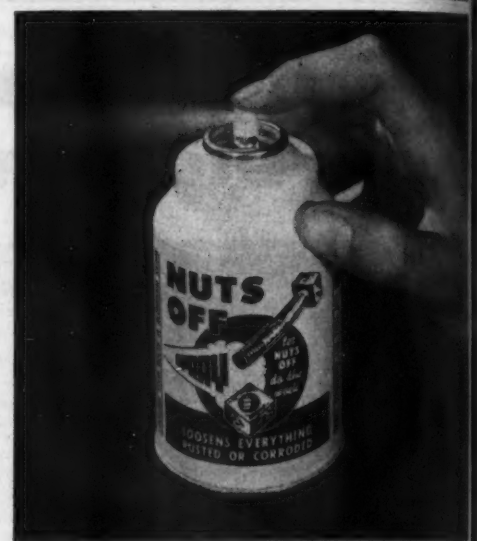
### Albert Kahn Associated makes personnel changes

■ A number of personnel changes have been made in the mechanical division of Albert Kahn Associated Architects and Engineers, Inc.

Saul Saulson, a vice president of the firm, has relinquished the duties of chief mechanical engineer to take up the post of director of mechanical engineering. He will be responsible for the advance analysis of all projects with respect to mechanical requirements and engineering design.

G. S. Whittaker, a vice president and director, has been made chief of the mechanical division. He formerly headed the heating department.

Other promotions in the mechanical division include Charles Allen, chief of heating engineering; Homer Yaryan, chief of plumbing engineering; and Norton Taylor, assistant chief of ventilating and air-conditioning engineering.



New fast acting penetrant and rust solvent... saves time, trouble, money and tempers. Available in pressurized cans or regular pints and gallons.

### SPRAY PRODUCTS CORPORATION

P. O. Box 844 • Camden 1, New Jersey

For more facts, circle No. 355

### CONTRACTORS REDUCE LABOR COSTS with hydraulically mechanized MATERIALS HANDLING



the HIAB 170

**SPEED  
LOADER**

Contractors such as Peter Kiewit Sons' Co., Guy F. Atkinson Co., and many others are reducing costs with the one man operated, fully hydraulic, Hiab Speed Loader. The Hiab provides hydraulically mechanized materials handling on a wide variety of utility jobs at LOW COST.

The HIAB 170 offers a range of lifting capacities from 6000 lbs. on the shortened boom of 5' to 2200 lbs. on a full boom of 13'. The boom length is easily adjustable through hydraulic control. Control is from either side of the truck cab.

Ideal for general maintenance work, the HIAB 170 will lift up to 20' above ground level at a maximum speed of 20" per second. Crane action is positive and accurate. 200° or 360° swing arc. When not in use the HIAB 170 folds snugly behind the cab, taking only 15' of space. This leaves the entire truck bed open for load.

Also available is the HIAB "Bimbo" Model 290 — a smaller version of the HIAB 170, with similar design features.

WRITE FOR NAME OF YOUR NEAREST DEALER

**Stanco** **Stanco**  
1666 Ninth Street 11901 So. Avenue "O"  
Santa Monica, California Chicago 17, Illinois

For more facts, circle No. 356

CONTRACTORS AND ENGINEERS



## 26-foot-diameter track planned to test mixture of slag, lime, fly ash

Construction starts this spring on a 26-foot-diameter highway test track that will get nearly a year's wear in a week.

The track, to be built at the University of Illinois, will be divided into six segments, one consisting of the Illinois highway department's standard crushed-stone base construction, others of experimental or test construction.

The subsoil under all sections will be the same. The water content in the subsoil will be varied at will to simulate actual field conditions.

Two truck wheels at the ends of a beam that will pivot at the middle of the test track will spin along the 50 feet of highway at speeds of from 3 to 36 mph, with loads varying from 1,000 to 3,000 pounds per wheel. The wheels will move in and out automatically, covering a path 2½ feet wide. In one day, the track will carry loads that will equal those imposed by traffic on an average secondary road in 50 days or more. Operation will stop for adjustments and lubrication only four hours out of every 24.

Basic information will be sought to set construction standards for low-cost secondary roads using a new mixture of materials.

This is a mixture of slag, plus lime, and fly ash now being field tested on several secondary roads in northern Illinois by the Cook and Lake county highway departments.

The first three years' work with the new test track will be devoted to research on this mixture. The next two years will be given over to tests on the use of lime to stabilize roadways.

When construction standards are established for the slag, lime, and fly ash mixture, mountains of useless slag and fly ash at power plants may become miles of excellent low-cost roads. Power plants in Illinois alone produce 1,500,000 tons of this material a year—enough to make 210 miles of roads.

The material is almost identical with that used for roads by the ancient Romans, and many of these roads are still in good condition after centuries.

Research costs of the project will be paid for by the National Lime Association, Washington, D. C.; Pozzolan Products Co. and Marblehead Lime Co., both of Chicago; and G. & W. H. Corson Co., Philadelphia.

## Disney film on highways

"Magic Highways—U. S. A.", a 16-mm sound and color film produced by Walt Disney, is available for showing before traffic engineering and highway groups.

The film traces the American highway system from 1901 to the present and attempts to show its future. It can be had on a loan basis by writing Hugh Penton, California Metal Enameling Co., 6904 E. Slauson Ave., Los Angeles 22, Calif.

For more facts, circle No. 357-

MOVING TOPSOIL into curbed parkway sections at the St. Bonifacius, Minn., Nike site is a Model H-70 Payloader. The rig, which has an operating capacity of 7,000 pounds, was used extensively in handling approximately 130,000 yards on the project. The Payloader was also used with a hydraulic backhoe attachment to dig 4,000 feet of trench and install 8 to 30-inch culvert for drainage.



## IF YOU PUT DOWN ASPHALT

check these facts about  
your source of supply

**Do you have a handy source for Asphalt?** Standard Oil has four strategically located refineries. They're handy to your job wherever it may be in the Midwest or Rocky Mountain states.

**Do you have a reliable source of supply?** Standard takes care of its customers in times when supplies are plentiful as well as when they are tight. You have a reliable source for Asphalt when you rely on Standard Oil.

**Do you get the sales service help you need?** Standard Asphalt salesmen have years of Asphalt and construction experience. They know your needs and how to render the kind of service that will help you get the job done. And wherever your job, a Standard Oil Asphalt salesman is nearby.

Get more information about Standard Oil Asphalt. Call the office near you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana)**, 910 South Michigan Avenue, Chicago 80, Illinois.



You expect more from **STANDARD** and you get it!





A SPECIALLY BUILT HYDRAULIC CLAMP, mounted on a Hyster Challenger 400 lift truck, can grasp a 27,500-pound load and rotate it through a 90-degree arc. The clamp was manufactured by Hyster Co., Portland, Ore., to handle concrete bridge piling in Venezuela. The clamp arms, each faced with 24 rubber pads, are of unequal length.



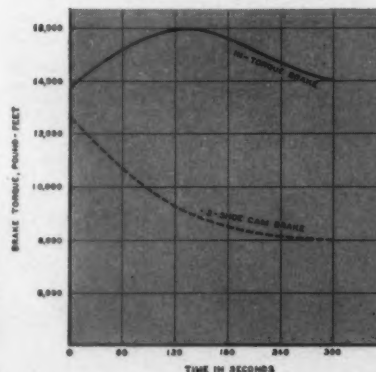
## Full contact braking surface stops your vehicles twice as fast

Today's heavyweight vehicles need braking power to suit—and you get it with B.F. Goodrich Hi-Torque brakes. With these brakes, each of the shoes is forced by hydraulic power against the inside of the brake drum to provide *full-circle* braking action. Here are the advantages:

- Stopping distance cut approximately in half compared to conventional two-shoe brakes tested on identical vehicles and loads.
- Increased safety and controllability of the vehicle, permitting faster, more profitable use by the operator... shorter work cycles.
- Brake torque is maintained with minimum "fading" because of the non-energized design.

Hi-Torque brakes adjust themselves automatically, need no lubrication. Available in sizes from 17 $\frac{1}{4}$ " x 4" to 26" x 7". For complete information ask your equipment manufacturer, or write B.F. Goodrich Aviation Products, a division of *The B.F. Goodrich Company*, Dept. CE-4, Troy, Ohio.

**DOUBLE THE TORQUE**—Dynamometer test made at constant speed 53 rpm, constant pressure conditions, brakes applied on 15-second cycles. Test duplicates operating conditions of heavy vehicle on long downgrade.



# B.F. Goodrich Hi-Torque brakes

For more facts, use Request Card at page 18 and circle No. 358

## Constitution Plaza project started in Hartford, Conn.

■ Constitution Plaza, an 11-acre 12 million redevelopment project in Hartford, Conn., has been started by F. H. McGraw & Co. of New York City and Hartford.

One of New England's best known urban renewal projects, Constitution Plaza has been in the development stage for several years. Demolition was completed last year.

Present plans call for two 16-story office buildings, retail commercial buildings, a large parking garage, and a television and radio facility for the Travelers Broadcasting Service Corp. Other buildings, including a hotel, may be added to the development.

The sponsor of the project is Constitution Plaza, Inc., which is owned jointly by the Travelers Insurance Co. and the McGraw company.

## Father-son combination to represent Malsbary

■ Edward H. Simpson, a new manufacturer's representative for Malsbary steam cleaners and steam generators in New England, joins his father, Ray F. Simpson, in the headquarters at 97 Nottingham Road, Brighton, Mass. Ray Simpson has been on the job for Malsbary for the past twelve years.

## Austin representative has new sales territory

■ Austin Powder Co., Cleveland, has appointed James T. Eddins as sales representative in eastern Tennessee, Georgia, and North and South Carolina.

Eddins has been serving in the Chicago district since 1953. He will make his new headquarters in Knoxville, handling sales of Austin explosives, permissibles, detonating fuses, blasting supplies, drill heads, and cutter bits.

## Crane Boom Electrocutions Continue

"Stop the Shock"

## Install SAF-T-BOOMS

"Saves Money and Lives"

Call, Write, Wire for Descriptive  
Brochures and Prices

John H. Finne, General Manager  
Saf-T-Boom Sales & Service, Inc.  
1613 Main Street  
Little Rock, Arkansas

CONTRACTORS AND ENGINEERS



# PRODUCT PARADE

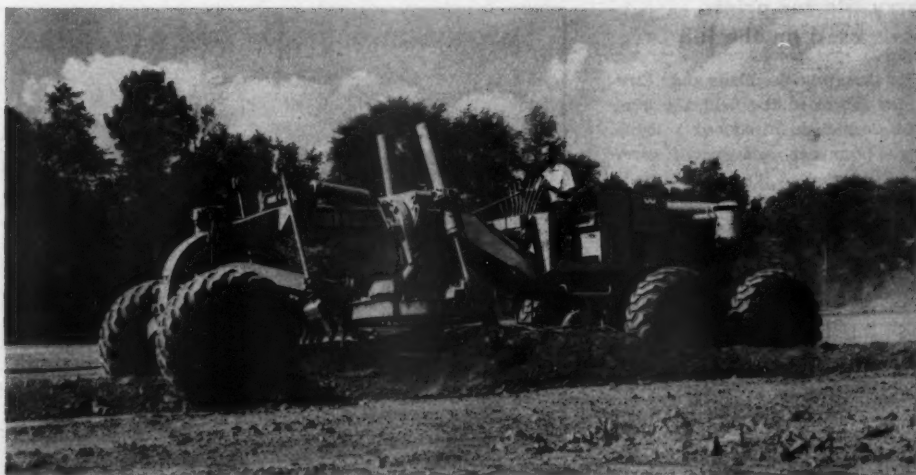
For further information on any of the products described in the following section, circle the designated number on the Request Card at page 18.

## Standard-transmission motor graders have six speeds forward and reverse

The Huber-Warco Co. announces a new series of standard-transmission motor graders. Designated Models 8-D, 9-D, 10-D, and 11-D, the machines offer 83, 100, 125, and 160 horsepower, respectively. Six speeds forward and reverse are standard on all models. Shifting from forward to reverse or reverse to forward is accomplished by moving only one lever. Optional creeper gears give three additional speeds in both directions.

The bulldozer design has been changed so that the dozer and the new push-block fit on the same heavy-duty bracket.

For further information write to the Huber-Warco Co., Dept. C&E, P. O. Box 501, Marion, Ohio, or use the Request Card at page 18. Circle No. 74.



## Ditcher has working speeds to 20 fpm; digs up to 2 feet wide, 6 feet deep

The Model 750 ditcher, a high-speed, heavy-duty, pneumatic-tire, vertical-boom machine designed to dig up to 2 feet wide and 6 feet deep, is available from Barber-Greene.

According to the manufacturer, this diesel-powered 18-ton unit can operate in temperatures ranging from 125 degrees above zero to minus 32 degrees, and it is capable of high-speed excavation in the most difficult materials. It can travel over the road at speeds up to 27 mph.

Controls are designed for easy one-man operation, and an all-hydraulic drive provides an infinite range of forward digging speeds from zero to 20 fpm.

For further information write to the Barber-Greene Co., Dept. C&E, 400 N. Highland Ave., Aurora, Ill., or use the Request Card at page 18. Circle No. 11.



## New heavy-duty trucks are lighter, shorter; feature increased traction

Two new heavy-duty chassis are offered by Mack Trucks, Inc.

They are the B-4626SX, a single-tire 6-wheel-drive model, designed for use with a concrete mixer, and the 6-wheel B-462S 4-wheel-drive chassis. The latter unit may also be used with a concrete mixer and is equally adaptable as a dump truck, states the company.

Both vehicles are powered by Mack's standard Magnadyne Model 401 150-hp engine, or optional EN 438 Thermodyne.

The front axle of the B-462S is nondriving and rated at 11,000 pounds. The B-4626SX features a 15,000-pound-rated driving type of axle.

For further information write to Mack Trucks, Inc., Dept. C&E, 1355 W. Front St., Plainfield, N. J., or use the Request Card at page 18. Circle No. 93.

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ENGINEERS  
APRIL, 1960





The Littleford Vibra-Topper can be used as a 1-ton static roller or an 8-ton vibratory roller.

### Vibratory power roller gives 2,600-pound thrust

The Vibra-Topper Model 125-V vibratory power roller is offered by Littleford Bros., Inc.

The vibratory portion is controlled by a separate clutch so that the unit may be used as a 1-ton static roller for blacktop or as an 8-ton vibratory roller for base rolling, depending on the requirements of the job.

The Model 125-V produces 2,600 pounds of thrust for maximum compaction.

For further information write Littleford Bros., Inc., Dept. C&E, 10 E. Pearl St., Cincinnati 2, Ohio, or use the Request Card that is bound in at page 18 of this issue. Circle No. 108.

### Carry file for prints, plans used on the job

For those who use plans and prints on the job or in the field, the Plan Hold Corp. has introduced a lightweight, compact, and rugged carry file.

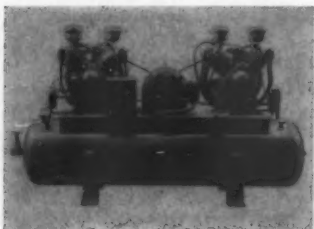
Called Roll-Pack, it consists of four durotubes mounted in a steel housing with a spring-latched door. The tubes are 2½ inches in diameter and 23½ inches long. The housing, which is equipped with a convenient fold-away handle for carrying, measures 12½ inches wide, 24¼ inches deep, and 4½ inches high. It accommodates the standard 24-inch plan width by practically any length. A 30-inch size is also available.

For further information write to the Plan Hold Corp., Dept. C&E, 5204 Chakemco St., South Gate, Calif., or use the Request Card at page 18. Circle No. 136.

### Air compressors offered in 15 and 20-hp models

A new line of air compressors is announced by the Champion Pneumatic Machinery Co.

Designated Model OE-36-15 for the 15-hp model, and OE-36-20 for the 20-hp unit, these compressors incor-



porate two Model RE-36 pumps driven by a single motor. Other features include 120-gallon tanks and magnetic starters.

The compressors are 95 inches long, 28 inches wide, and 54 inches high. Maximum working pressure is 200 psi. Displacement for the 15-hp model is 76 cfm at 100 psi, 63.4 cfm at 200 psi; for the 20-hp model, 96 cfm at 100 psi, 80 cfm at 200 psi.

For further information write to the Champion Pneumatic Machinery Co., Dept. C&E, Princeton, Ill., or use the Request Card at page 18. Circle No. 55.



## A MAJOR ENGINEERING BREAK-THROUGH IN EXCAVATOR DESIGN

**You get up to 25% more output with "integrated" controls, the "VICON" system of power application and control, and the new "interlock" drum arrangement**

The Manitowoc 4500 Vicon is a 6 yard shovel or 7 yard dragline, incorporating an entirely new concept of excavator design and performance. Over 3 years of on-the-job-experience has proved its soundness of design, greater ease of operation; much faster operating cycles; greatly reduced maintenance costs; and far greater output from both shovels and draglines.

### "Integrated" Controls Simplify Operation, Clutch Slippage Eliminated

Operating the Vicon is like flying . . . Cycle phases are that smooth, that "integrated"! Even green hands get results because it takes 50% less operator movement to run the machine.

Conventional engine throttles have been eliminated. Each clutch control lever in the high visibility Vicon pilot house is also a throttle! Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center

(stop) position. The further the lever is moved the natural direction of the machine's movement faster and harder it works in that direction.

There is no slippage when clutches are engaged because the first 10° of control lever movement does not activate the throttle—therefore, clutch engagement is effected at low engine R.P.M. and almost zero drum R.P.M. By continuing to move the clutch control lever, which is also the throttle, the machine is accelerated via fast, smooth, three stage torque converter against the load . . . without any clutch slippage.

### No Brakes Needed To Stop The Swinging Action

In conventional excavators it is normal to apply considerable "braking" effort to halt the "swing" of the machine so that it can be started in the opposite direction. Before "Vicon" it was necessary for the opposite clutch or swing brake to take this thrust (the disadvantages of excessive friction heat and wear are obvious). With Vicon the machine stops swinging one way and very smoothly accelerates in the opposite direction because the torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions and then provides instant acceleration for the return swing.





Designed to replace conventional dual tires, the single truck tire (left) requires considerably less space than duals, and features a lower spring rate that results in a softer ride, better load cushioning, and reduced truck maintenance. The wide-base tire and wheel are said to be substantially lighter than duals, permitting a lower ready-for-the-road weight. For further information write to The Firestone Tire & Rubber Co., Dept. C&E, 1200 Firestone Parkway, Akron 17, Ohio, or use the Request Card at page 18. Circle No. 87.

#### Application Has Great Versatility

"Vicon" is two engine power applied in a way never used for power shovels and draglines... and boundless advantages in performance, maintenance characteristics, and production! One engine provides the power for swing and travel while the other powers the drums... allowing you to perform several functions simultaneously, in a smooth blend of cycle phases that provide operating speeds beyond the capabilities of conventional excavators.

This design gives you faster, smoother clutch engagement with drastic improvements on the conventional problem of wear, heat and fade... yet you maintain top working speeds.

With the Vicon power application, certain operating changes are immediately obvious... For instance, the engine may be slowed down to accommodate an extremely tough phase of the cycle without jeopardizing the ability of the other engine to immediately take over the following phase of the working cycle. Or, the engine may complete its assignment at a relatively low speed while the power of the other is introduced at high R.P.M. to take over the next phase of the cycle. Valuable production time is not lost because the engine "lug down". On the other hand, clutches are jammed into engagement at high and harmful speeds... The result, a smoother, faster, more economical operation with greater output, longer machine life, better all-around performance.

#### "Interlock" Reduces Brake Use By 50%

Machine operation is so smooth that the machine seems to glide on the job. Yardage totals, however, tell the story. For instance, on the Vicon dragline you have the new "interlock" drum arrangement which permits the dragline bucket in the middle of an end-line... cuts brake use up to 50% and you take advantage of full horsepower on the hoist (instead of wasting it up on the brakes).

#### Machine Has Doubled Drum Brake Capacity

You get higher speed dragline cycles than were ever before possible—and designed into this new Vicon dragline is another innovation included specifically for pin-point control and increase production.

The outside flanges of both the front and rear drums of the Vicon serve as big, fast acting efficient braking surfaces. The advantages are readily apparent on steep stripping locations where the operators take advantage in maintaining such pin-point casting control as they actually trim and maintain vertical side walls. It is common, for instance, to see a Vicon operator taking advantage of Vicon "Interlock" making high



speed casts with the bucket held in a vertical position (teeth down). The bucket rushes out at full speed, is stopped smoothly over the top of the cut and then allowed to drop vertically to trim the wall. Vicon dragline drum "interlock" and drum brakes are in a class by themselves. Production gains are assured!

#### Other Innovations Are Yours With Vicon

For instance, a big universal radiator system gives you double the cooling capacity. Advantages of the Vicon cooling system are never more obvious than in prolonged travel with the Vicon maneuvering easily from one job location to the other. Travel, a situation embodying the most serious over-heating possibilities for the conventional machine, is no problem for the Vicon... which simply utilizes two engine cooling capacity for the operation of a single power system.

#### Shovel Has Less Weight—More Power On "Business End"

The Vicon shovel has all the advantages of the big, tough Model 4500 tubular style dipper stick and having separate hoist lines rigged from either side of the shovel bail to the other end of a reduction drive mounted on the base of the shovel boom—eliminating the weight and instability of a bail sheave at the bucket, plus bad fleet angles on the hoist cables.

There are many, many more design and operating features adding up to more output—reduced maintenance costs and lower cost yardage. Before you buy any machine in this class, it will pay you to get the complete story on the sensational 4500 Vicon.

#### New transit mixer carries more payload

A new 7-cubic-foot transit mixer designed to carry 16 per cent more payload than previous models is announced by The Jaeger Machine Co.

Aluminum parts reduce dead weight of the new unit by approximately 1,500 pounds, states the company.

For further information write to The Jaeger Machine Co., Dept. C&E, 550 W. Spring St., Columbus 15, Ohio, or use the Request Card at page 18. Circle No. 128.

#### Portable water heater for concrete mixing

A portable water heater that can produce 600 gph of 180-degree-F water for use in cold-weather concrete-mixing operations is announced by the Hauck Mfg. Co.

Designated Model 312G, it reportedly produces water of 125 degrees F in two minutes after lighting the burner and can produce hot-water temperatures as high as 190 degrees F.

The unit includes a built-in hot-water recirculating system to provide a steady, uninterrupted supply of water of uniform temperature.

The fuel used can be kerosene, or liquefied propane or butane gas. Equipment for burning specified fuel is supplied with the heater. The heater can also be furnished to burn natural, manufactured, or mixed gas.

For further information write to the Hauck Mfg. Co., Dept. C&E, 126 Tenth St., Brooklyn, N. Y., or use the Request Card at page 18. Circle No. 67.



**Manitowoc**

#### MANITOWOC ENGINEERING CORP.

(A Subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

**SHOVELS**  
1 1/4 — 6 YDS.

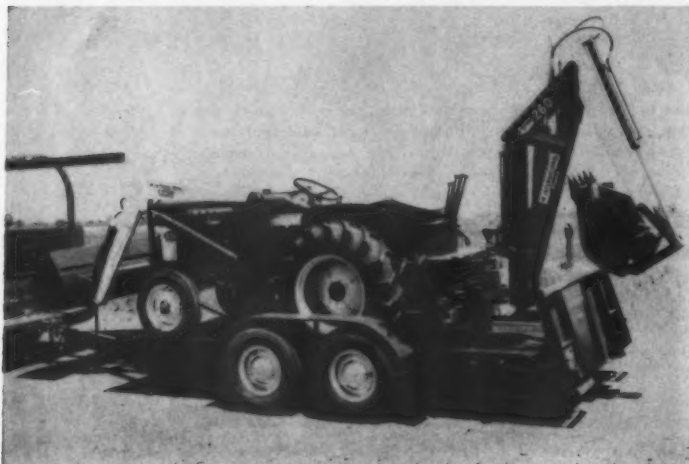
**CRANES**  
25 — 125 TONS

**DAGLINES**  
1 1/4 — 7 YDS.

**TRENCH HOES**  
1 1/4 — 3 YDS.

For more facts, use Request Card at page 18 and circle No. 359





International Harvester's new No. 95 low-bed trailer can handle loads of up to 9,500 pounds. The 4-wheel unit features a rubber-mounted wheel-suspension system for smooth movement.

#### Four-wheel trailer for equipment hauling

The International Harvester Co. has introduced a 4-wheel low-bed trailer with 9,500 pounds rated capacity.

Designated No. 95, the unit is equipped with rubber-mounted torsion axles that act as a combination spring and shock absorber, and work equally well whether the vehicle is loaded or empty. Independent oscillation of each wheel enables smooth movement of the trailer when pulled

over rough terrain or at normal highway speeds.

A ramp for fast one-man loading and unloading operations also serves as the unit's tail gate.

Over-all width of the No. 95 is 7 feet; over-all length, 19 feet. The width measures 76 1/4 inches; bed length, 14 feet. The basic machine weighs 1,600 pounds.

Two and 4-wheel electric brakes are offered as optional equipment.

For further information write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 62.

more air reserve for safer braking...

**Wagner**  
**ROTARY AIR**  
**COMPRESSORS**  
provide rapid pressure  
recovery to assure  
ample air  
at all times



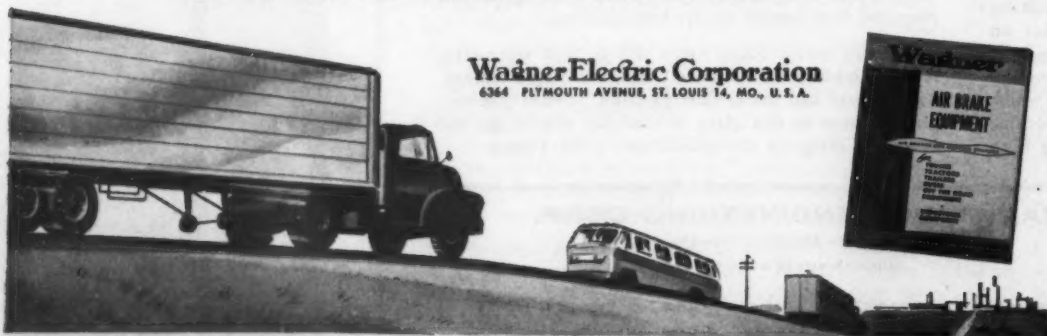
Wagner Rotary Air Compressors have what it takes to deliver a constant and smooth flowing supply of compressed air at all times. Their ability to provide rapid pressure recovery means safer stopping power even under the most severe braking conditions.

Rotary compression forces all air from the compression chamber. Oil and air are separated and cooled before air is discharged to prevent carbon formation in air lines. All rotating parts are turned by the rotor shaft which is suspended on two bearing surfaces to lower friction loss. Uniform torque load with moderate stresses assures smooth, quiet operation with long belt life even at high compressor speeds.

Field tests and fleet records show that Wagner Rotary Air Compressors help keep air brake maintenance costs down. Their exceptionally long service life and easy, infrequent preventive maintenance adds up to greater economy... greater performance... greater safety. Available in either 9 C.F.M. capacity, air or water cooled; or 12 C.F.M. capacity, water cooled.

For full information about these compressors and details on complete Wagner Air Brake Systems and Equipment for trucks, trailers, tractors, buses and off-the-road equipment, send for your free copy of Wagner Catalog KU-201.

Remember, when ordering new equipment, be sure to specify Wagner Air Brakes.



LOCKHEED HYDRAULIC BRAKE PARTS, FLUID and BRAKE LINING • AIR HORNS • AIR BRAKES • TACHOGRAPHS • ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES

For more facts, use Request Card at page 16 and circle No. 360

#### New LP-gas burners for variety of uses

Wemco Products announces two new LP-gas burners for tar kettles, aggregate driers, and asphalt machines.

One of the units, the Model TK-150-A, is rated 2 million Btu at 30 pounds pressure.

The Model TK-10, a large vapor gas burner, is also available.

For further information write to Wemco Products, Dept. C&E, 733 E. Nine Mile Road, Hazel Park, Mich., or use the Request Card at page 18. Circle No. 94.

#### Single-operator trencher has five digging widths

The Arps Corp. announces a new one-man-operated trencher, the Trench Devil Model MA-2.

There are five digging widths—2 3/4, 3 1/2, 4, 6, and 8-inch—and the unit digs to a depth of 54 inches. Digging speed is variable from 0 to 1,200 feet per hour in either direction.

When digging depth is reached, a pointer is set in line with a marker. Successive raising and lowering of the boom always brings the unit back to the desired depth without any additional measuring.

For further information write to the Arps Corp., Dept. C&E, New Holstein, Wis., or use the Request Card at page 18. Circle No. 106.



At the 2-foot depth, digging speed of the new Arps Trench Devil reportedly averages 205 feet per hour with an 8-inch width.

CONTRACTORS AND ENGINEERS



### Transit-mixer offers 6½-cubic-yard capacity

A new 6-wheel-drive Autocar, with 33,000-pound gvwt and 6½-cubic-yard capacity, is announced by The White Motor Co.

Designated Model C5566, the 6x6 truck is designed to provide maximum traction for full-load mixer operations in all types of terrain and weather conditions.

Standard specifications include an 11,000-pound-capacity front-driving steering axle, Super Mustang 170-hp gasoline engine, 5-speed transmission, 5-speed transfer case with ratios of

1.00:1 and 2:48:1, and a 34,000-pound-capacity double-reduction tandem rear axle equipped with inter-axle differential and power-operated lockout. A package of optional components will increase the gvwt to 50,000 pounds.

A simplified belt-drive flywheel power takeoff operates the mixer.

For further information write to The White Motor Co., Autocar Division, Dept. C&E, Exton, Pa., or use the Request Card at page 18. Circle No. 116.



On the new Autocar Model C5566, the power takeoff consists of a steel-cable-reinforced toothed belt running from a cog on the engine flywheel to the power-takeoff shaft.

### Roller can be carried on truck tail gate

A new single-drum self-propelled maintenance roller is announced by Vibro-Plus Products, Inc.

Known as Model CL-21, this vibratory compactor draws its power from a Wisconsin 8-hp air-cooled engine, mounted in the open for easy accessibility and maintenance.

Major design features include an 8-inch frame clearance; fixed lift hooks to permit the machine to be picked up and carried on a truck tail gate; simple throttle control to handle both working and travel speeds; and the ability to put the drum flush with curb.

For further information write to Vibro-Plus Products, Inc., Dept. C&E, Stanhope, N. J., or use the Request Card at page 18. Circle No. 24.

### New safety belt is strong but lightweight

A new safety belt is offered by the Rose Mfg. Co.

According to the manufacturer, this belt is designed to reduce body injury caused by the shock load resulting from a fall, as well as to eliminate the danger of slipping out of the belt.

The belt has exceptional strength, but it weighs only 2 pounds.

For further information write to the Rose Mfg. Co., Dept. C&E, 2700 W. Barbary Place, Denver, Colo., or use the Request Card at page 18. Circle No. 124.



## GET NEW MOBILITY FOR DRILLS UP TO 6 INCH BORE with the JOY TDH Trac-Drill



The new Joy TDH Trac-Drill is a sure-footed carrier for Joy's powerful 5¼", 5½" and 6" bore percussion drills. Rugged enough to support these large drills with ease, it is also amazingly flexible and mobile. The TDH moves quickly, (at speeds up to 60 fpm), over the roughest ground because its crawler tracks are free to oscillate—to move and swivel independently of each other.

Wide track gauge, 85½" center line to center line, and long tracks (88" of ground contact with each track) gives the TDH positive traction and stability. Mounted low on the frame for stable support, the mast handles 20 foot steel changes, and can be hydraulically positioned to drill at angles from 15° in front of vertical to 10° above horizontal.

A big drill for big jobs, the TDH requires just one man for all operations. All machine functions are power-controlled from the operator's station. Have your Joy representative arrange for you to see this flexible, big-hole drill, or write for Bulletin 1419-21.



JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA



# JOY

Joy Manufacturing Company  
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company  
(Canada) Limited, Galt, Ontario

For more facts, use Request Card at page 18 and circle No. 361



### Carrier-mixer package offered in two models

A new Rex carrier and mixer package is available from the Chain Belt Co. The carriers, manufactured by the Crane Carrier Corp., will be marketed under the Rex Mixer-Master trade name.

Two basic units are offered: the conventional model and a lightweight model. The lightweight unit is designed to provide greater payloads under existing state weight laws. Made of alloyed steel and aluminum, it reduces carrier weight by approximately 2,000 pounds.

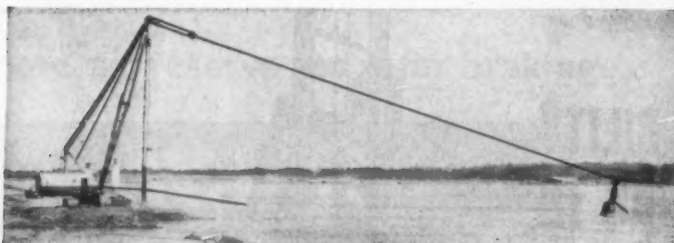
Both conventional and lightweight

units are available in four standard models. Custom-built models for special requirements are also available.

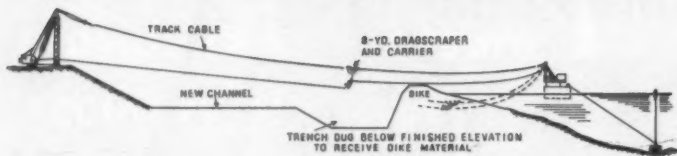
All carriers feature a "control-tower" cab for maximum visibility and shortened wheel bases for greater on-the-job maneuverability.

In addition, the Rex Mixer-Master has a full torque engine flywheel power takeoff.

For further information write to the Chain Belt Co., Dept. C&E, 4701 W. Greenfield Ave., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 144.



### Eight-Yd. Sauermaier DragScraper Cuts Seaway Dike Removal Costs

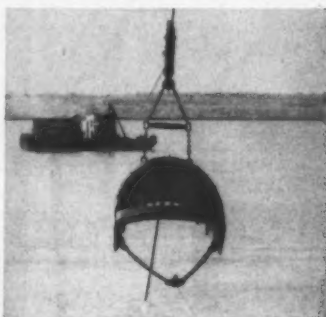


Atlas Construction Co. Ltd., Montreal, Que., had the job of enlarging the St. Lawrence Seaway channel near Iroquois, Ont. An 8-yd. Sauermaier Crescent DragScraper and four-wheeled carrier was used with a crane to remove the perimeter dikes composed of tough digging glacial till and to backfill the trenches.

The hoisting line of the crane, used as a track cable for the Crescent and carrier, ran through a block on the boom tip to a 25-ft. tail tower mounted on a 20 x 40-ft. barge. The structural steel spud mast used to support the boom was pin-connected to facilitate movement of the crane.

After inhauling to the trench, the 8-yd. Crescent was gravity-returned part of the way to the excavation. A single-drum hoist mounted on the barge tail tower controlled the backhaul cable used to complete the return cycle. The job was handled by two operators, one on the crane and the other on the barge. The operating span varied from 600 to 900 ft. Average DragScraper hauls were 300 to 600 ft.

This is a typical example of how a crane can handle a Crescent DragScraper of greater capacity than the original dragline bucket or clamshell. Larger machines can usually double their capacity with a DragScraper. Smaller units can handle about 50% more. Machine range is limited only by the spooling capacity of the hoist drums. It can reach farther, dig deeper under water and take material out of soft areas without the nuisance of mats and the hazard of undermining the crane.



DragScraper traveling down track cable on return to underwater dike. Barge is in background.

When the boom is supported by a strut, a DragScraper of still greater capacity can be used. The strut increases overturning resistance and allows a greater load to be imposed. Crescents used in conjunction with such supports increase the rated capacity as much as 4 to 1.

Many operators consider the Crescent DragScraper as standard auxiliary equipment. The DragScraper permits bidding on and getting those premium jobs that could not be handled without considerably more time and expense by other means.

Find out how much you can increase your crane's capacity. Write or call giving the make, model number and boom length of your machine. Field Report 228 and Catalog J gives more information on DragScraper operations with cranes.

**SAUERMAN**

50th Anniversary Year

**BROS., INC.** 624 SO. 28th AVE. BELLWOOD, ILL.

LInden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Duralite Blocks

For more facts, use Request Card at page 18 and circle No. 362



The MoTrac offers five forward speeds ranging up to 7.25 mph, and five in reverse ranging to 9.07 mph.

### Powerful crawler tractor is high-speed machine

A new 59-hp crawler tractor is announced by the Minneapolis-Moline Co.

Designated MoTrac, the machine features torque converter and instantaneous full-power reversing shuttle.

Moline-built diesel and gasoline-engine models have been fully integrated with the 5-speed transmission in the new crawler. Five forward speeds range from 1.3 to 7.25 mph, and five reverse speeds range to 9.07 mph. The MoTrac has a 4-cylinder engine that delivers 59 horsepower at 2,000 rpm on gasoline, and 53 horsepower at 2,000 rpm on diesel.

The "heel-and-toe" Hydro-Shuttle forward-reverse direction control frees the operator's hands for steer-

ing and for operating attached load-

Street plates or grouser of 14-inch width are standard equipment, and optional 12 and 16-inch widths are available.

According to the manufacturer, the MoTrac has been designed for easy mounting of equipment. The loader is mounted on the cross shafts and secured at four points. The dozer has a simple 4-point mounting on the track frame. The scarifier is easily mounted on two arms bolted to the differential housing.

For further information write to the Minneapolis-Moline Co., Dept. C&E, 130 Ninth Ave. S., Hopkins, Minn., or use the Request Card at page 18 of this issue. Circle No. 92.

For further information on any product described in this section circle the indicated number on the Request Card at page 18.

### 'Life Guard' Hats & Caps

The best in head protection for electrical/construction workers

Jackson's 'Life Guard' safety hats and caps safely resist over 20,000 volts, and they also provide impact resistance to more than satisfy federal requirements for safeguarding construction workers.



'Life Guard' safety caps have narrow brim around sides and back, visor in front. Injection molded plastic is strong yet flexible, has a soft comfortable feel. Caps may be ordered with attached welding helmets, goggles, and assorted face shields.

'Life Guard' safety hats offer neck protection with wide brim all around. The 'Life Guard' headgear is instantly adjustable in hat sizes, and its comfort keeps the hat where it does its job, on the worker's head. Chin straps and warm winterizers are available.

Standardize on this all-purpose safety hat for maximum head protection. Identify work categories by issuing these different hat colors: white, yellow, grey, and orange.



**Jackson Products**

31739 Mound Road, Warren, Michigan

Sold by better welding supply and safety product dealers everywhere

For more facts, use Request Card at page 18 and circle No. 363

CONTRACTORS AND ENGINEERS



## Hydraulic check valves for in-line mounting





## New 6¼-inch transit reads to 20 seconds

For further information write to the Umeco Optical Division, Dept. 4, 465 California St., San Francisco 4, Calif., or use the Request Card at page 18. Circle No. 47.



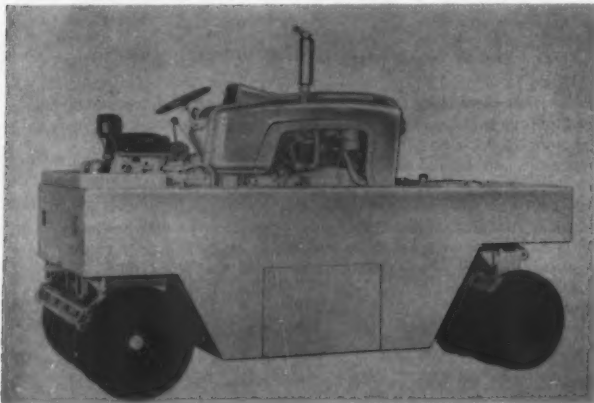
## A black and white photograph showing two men in a trench. One man, wearing a plaid shirt and a hat, is looking down at the ground. The other man, wearing a light-colored shirt and a hat, is standing next to him. A large, curved pipe or hose is visible on the right side of the trench.

305 BOWMAN STREET • MANSFIELD, OHIO  
GORMAN-RUPP OF CANADA, LIMITED  
ST. THOMAS, ONTARIO

160 GPM MODEL 12B2	350 GPM MODEL 13A2	600 GPM MODEL 14A2	1400 GPM MODEL 16A2
			

137





The Western Model 12-SP is powered by a 57-hp gasoline engine with torque converter, reverse shuttle drive, and 5-speed transmission.

### Pneumatic-tire roller weighs up to 15 tons

A 9-wheel pneumatic-tire, self-propelled roller has been announced by the Western Equipment Division of the Douglas Motors Corp.

Designated Model 12-SP, the unit is powered by a 57-hp 4-cylinder gasoline engine complete with torque converter, reverse shuttle drive, 5-speed transmission, and hydraulic power steering.

Standard models are equipped with oscillating front wheels, fully enclosed chain drive, and 12-volt battery with starter and generator. Oscillating drive wheels, sprinkler bars and coco mats, and front and rear lights are optional features.

With special ballasting, the unit weighs 30,000 pounds.

For further information write to the Western Equipment Division, Douglas Motors Corp., Dept. C&E, 1234 N. 62nd St., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 95.

### Elastomeric spray mulch effects erosion control

A spray mulch for use along highways and landscapes to control soil erosion and speed seed germination is offered by the Alco Oil & Chemical Corp.

Called Vulcanol, it is said to be particularly effective on graded areas and sloped terrains. A nonflammable, nonirritating elastomeric polymer emulsion, it can be applied with standard spray equipment under a variety of conditions, including temperatures as low as 45 degrees F.

The manufacturer points out that Vulcanol is a surface, rather than a penetrating, treatment and will stay in place long enough for seed to germinate. Under ordinary conditions, states the company, a slope can be prepared, seeded, sprayed with Vulcanol; thereafter, grass will come through to handle the erosion problem and thus eliminate the need for further Vulcanol applications.

For further information write to the Alco Oil & Chemical Corp., Dept. C&E, Trenton Ave. and William St., Philadelphia 34, Pa., or use the Request Card that is bound in at page 18. Circle No. 107.

### Equipment hour meters offered in two sizes

A new line of sealed, rugged hour meters, which show in hours and minutes the cumulative operating time, up to 100,000 hours, of any equipment run with 120 to 480-volt ac, is offered by the John W. Hobbs Corp., a division of the Stewart-Warner Corp.

These easily readable units are designed to withstand extreme operational shocks or vibrations, as well as to exclude dirt or moisture. They are available in 2½ and 3½-inch diameters.

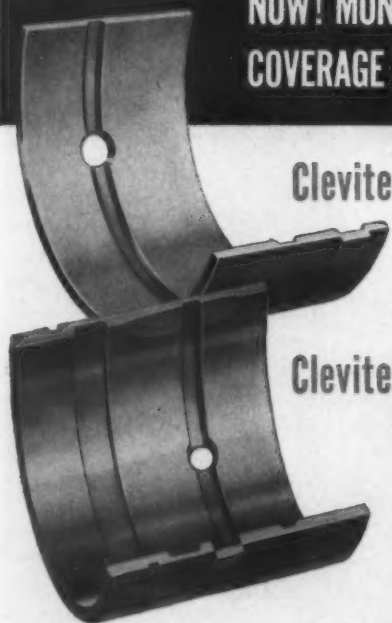
For further information write to the John W. Hobbs Corp., a division



of the Stewart-Warner Corp., Dept. C&E, P. O. Box 358, Springfield, or use the Request Card at page Circle No. 3.



## NOW! MONMOUTH OFFERS COMPLETE ENGINE BEARING COVERAGE TO THE CONSTRUCTION FIELD



### Clevite 77 BEARINGS

CLEVITE 77, with patented cast copper lead tri-metal construction, provides greater load carrying capacity, longer life.

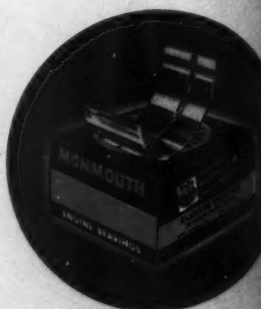
CLEVITE 77 (the bearing preferred by O.E.M.) saves time and money with more hours of service, lower maintenance costs.

### Clevite ALUMINUM BEARINGS

Now! A full line of Steel Backed and Solid Aluminum bearings (identical to original equipment in design and materials) is available for ALL special earthmoving equipment.

A complete range of undersizes will give you up to four regrinds extending crankshaft life.

The coverage, availability and service you receive from your NAPA Jobber makes it easy for you to use the best—CLEVITE—from the world's leading original equipment manufacturer.



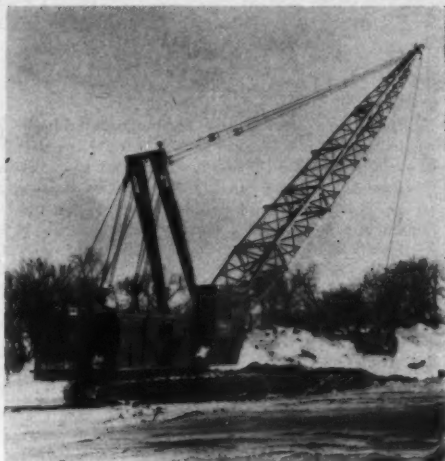
For your nearest jobber, contact one of the NAPA warehouses listed on opposite page

## MONMOUTH Engine Bearings

CLEVITE SERVICE: Cleveland Graphite Bronze • Division of Clevite Corporation • Cleveland 3, Ohio

For more facts, use Request Card at page 18 and circle No. 365





### New excavator eliminates clutch slippage

The Manitowoc Engineering Corp. announces the Model 4500 Vicon 6-yard shovel or 7-yard dragline.

According to the company, new integrated controls simplify operation, and clutch slippage is eliminated.

There are no conventional engine throttles on the Vicon—each clutch control lever in the pilot house is also a throttle. Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center (stop) position. The farther the lever is pushed or pulled in the natural direction of the machine's movement, the faster and harder it will operate in

that direction.

There is no slippage when clutches are engaged, because the first 10 degrees of control-lever movement does not activate the throttle; thus clutch engagement is effected at low engine rpm and almost zero clutch and drum rpm. The 3-stage torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions, and then provides instant acceleration for the return.

For further information write to the Manitowoc Engineering Corp., Dept. C&E, 16th and River Sts., Manitowoc, Wis., or use the Request Card at page 18. Circle No. 130.

## Monmouth ENGINE BEARINGS



- PA Atlanta  
Baker Street, N.E.  
Box 4005, Station M  
Atlanta, Georgia
- PA Birmingham  
South 23rd Street  
Birmingham 2, Alabama
- PA New England  
Hamer Street  
Boston 26, Mass.
- PA Dallas  
Main Street  
Dallas 5, New York
- PA Charleston  
10th Street, S.E.  
Charleston 31, West Virginia
- PA Charlotte  
11th Street, S.W.  
Charlotte, North Carolina
- PA Chicago  
West 35th Street  
Chicago 16, Illinois
- PA Cleveland  
East 55th Street  
Cleveland 3, Ohio
- PA Columbus  
Grandview Avenue  
Columbus 8, Ohio
- PA Dallas  
10th Northwood  
Dallas 1, Texas
- PA Denver  
Tennant Box 5386  
Denver 17, Colorado
- PA Des Moines  
1st & Mulberry Streets  
Des Moines 5, Iowa
- PA Detroit  
Cotton Avenue  
Detroit 1, Michigan
- PA Fresno  
L Street  
Fresno 10, California
- PA Great Rapids  
Main Avenue, N.W.  
Great Rapids 2, Michigan
- PA High Point  
Box 5029  
High Point 20, Virginia
- PA Houston  
Main Street  
Houston 6, Hawaii
- PA Houston  
Main Street  
Houston 17, Texas
- PA Indianapolis  
North Illinois Street  
Indianapolis 4, Indiana
- PA Jacksonville  
Main Street  
Jacksonville 1, Florida
- PA Kansas City  
Main Street  
Kansas City 8, Missouri
- PA Los Angeles  
Main Washington Boulevard  
Los Angeles 15, California
- PA Louisville  
Main & Jacob Streets  
Louisville 10, Kentucky
- NAPA Memphis  
801 East Georgia Avenue  
Memphis 2, Tennessee
- NAPA Miami  
104 N. E. 13th Terrace  
Miami, Florida
- NAPA Milwaukee  
767 N. Jackson Street  
Milwaukee 2, Wisconsin
- NAPA Minneapolis  
50 Spruce Place  
Minneapolis 3, Minnesota
- NAPA New Orleans  
855 Baronne Street  
New Orleans 13, Louisiana
- NAPA New York  
517 West 59th Street  
P. O. Box 318  
Radio City Station  
New York 19, New York
- NAPA Oakland  
401 27th Street  
Oakland 12, California
- NAPA Oklahoma City  
700 South Western  
Box 1821  
Oklahoma City 4, Oklahoma
- NAPA Omaha  
2027 Harney Street  
Omaha 2, Nebraska
- NAPA Philadelphia  
1600 Hunting Park Avenue  
Philadelphia 40, Penna.
- NAPA Phoenix  
324 West Adams Street  
Phoenix 1, Arizona
- NAPA Pittsburgh  
5620 Penn Avenue  
Pittsburgh 6, Penna.
- NAPA Portland  
3241 N. W. Industrial  
Portland 10, Oregon
- NAPA Richmond  
1302 MacTavish Avenue  
Richmond 20, Virginia
- NAPA Salt Lake City  
28 S. W. Temple Street  
Salt Lake City 1, Utah
- NAPA San Antonio  
710 Broadway  
San Antonio 5, Texas
- NAPA San Diego  
1123 Island Avenue  
P. O. Box 629  
San Diego 12, California
- NAPA San Francisco  
25 Division Street  
San Francisco 3, California
- NAPA Seattle  
2700 4th Avenue, South  
Seattle 4, Washington
- NAPA Spokane  
125 South Sheridan Street  
P. O. Box 1444  
Spokane 6, Washington
- NAPA St. Louis  
3301 Locust Street  
St. Louis 3, Missouri
- NAPA Syracuse  
345 Post Street  
Syracuse 3, New York

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the handy Request Card that is bound in at page 18 of this issue.

### Cleaning, descaling tool works uneven surfaces

A cleaning and descaling tool said to prepare, effectively and rapidly, practically all surfaces is offered by The Marindus Co., Inc.

Called Von Arx, the air gun cleans, descales, and prepares surfaces by means of a set of rapidly reciprocating steel needles striking the surface being worked. It operates on normal air pressure—not more than 90 psi—and consumes a maximum of only 15 cfm.

The needles adjust automatically for working uneven surfaces such as rivets, crevices, grooves, and corners.

Two types of needles—chisel-tip and blunt-tip—are available in three sizes. The chisel-tip needles are used to scarify concrete and other surfaces, the blunt-tip for cleaning and polishing.

The Von Arx air gun is also offered in three sizes, and in kits with accessories for specific applications.

For further information write to The Marindus Co., Inc., Dept. C&E, 51 Pine St., New York 5, N. Y., or use the Request Card at page 18. Circle No. 70.

### Masonry water repellent cuts freeze-thaw damage

The Building Products Division of L. Sonneborn Sons, Inc., has announced an improved silicone-type masonry water repellent, Hydrocide S-X colorless Hycon, which is said to provide a marked increase in water repellency and durability.

According to the manufacturer, it is especially resistant to destructive alternating freeze-thaw cycles.

For further information write to the Building Products Division, L. Sonneborn Sons, Inc., Dept. 00, Dept. C&E, 404 Park Ave. South, New York 16, N. Y., or use the Request Card that is bound in at page 18 of this issue. Circle No. 46.

## TIME IS MONEY!



Smith-Field Automatic Curb and Gutter Machine in operation.

### THE SMITH-FIELD

Automatic

### CURB AND GUTTER LAYING MACHINE

Operating 4 net hours, will lay 1000 ft. of integral curb and gutter per day

### THE STEPHENS-CANFIELD

Automatic

### CURBER

Operating 4 net hours, will lay 2000 ft. of curbing per day



Stephens-Canfield Automatic Offset Curber — Model 66W



Stephens-Canfield Automatic Curber — Model 66A

## POWER CURBERS, INC.

P. O. BOX 1261 — TELEPHONE ME 4-8071  
SALISBURY, NORTH CAROLINA

U. S. PATENTS  
SUCCESSORS TO  
F. L. HARTMAN ASSOCIATES

4126

For more facts, use Request Card at page 18 and circle No. 366





This single rotor impact crusher, available in 38×50-inch, 46×54-inch, and 56×60-inch feed-opening sizes, is offered by the Rogers Iron Works Co. These machines have a specially designed lower chamber that permits any large piece passing the feed opening to be crushed without bridging. The crusher is also able to handle feeds containing a large proportion of mud, which would normally clog machines of this type. Capacities range from 250 to 1,200 tph. Portable, semiportable, or stationary units are available. For further information write to the Rogers Iron Works Co., Dept. C&E, P. O. Box 869, Joplin, Mo., or use the Request Card at page 18. Circle No. 125.

For further information on any product described in this section circle the indicated number on the Request Card at page 18.

### Smooth, rounded corners on formed concrete

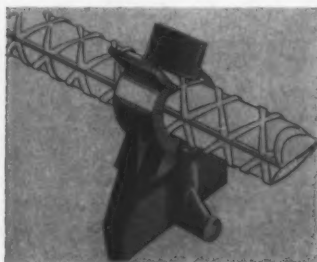
Green Streak corner former is a specially designed premolded, plastic material that produces a smooth, uninterrupted, rounded 1-inch-radius corner on formed concrete.

In addition to its use on columns, pillars, piers, beams, panels, and many other types of precast-concrete work where a smooth, rounded corner is desired, it can be quickly and easily installed on standard forms and is fully re-usable.

For further information write to the Servisised Products Corp., Dept. C&E, 6051 W. 65th St., Chicago 38, Ill., or use the Request Card that is bound in at page 18 of this issue. Circle No. 25.

### Polyethylene supports hold reinforcing bars

The Universal Builders Supply Co., Inc., offers solid polyethylene bar supports designed to hold the rein-



forcing bars in concrete slabs, columns, and beams.

With the supports, designated P-Kay slab bolsters, the bar is easily snapped into place and maintains stability under normal pouring conditions.

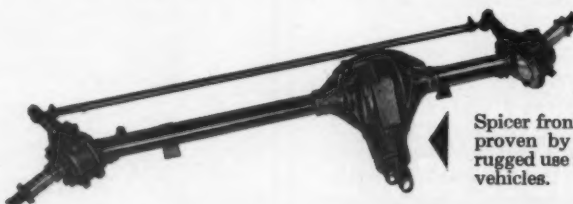
P-Kay bolsters are light in weight, range in height from ½ inch to 1½ inches, and will hold a No. 3 to No. 9 bar.

For further information write to the Universal Builders Supply Co., Inc., Dept. C&E, 787 United Nations Plaza, New York 17, N. Y., or use the Request Card at page 18. Circle No. 103.

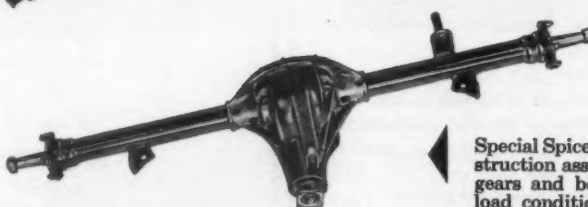
## With Power-Matched Your Trucks Will Live

Only Spicer provides the operating advantages of power-matched design, because only Spicer designs and manufactures complete 4-wheel drive assemblies for light and medium-duty trucks. The Spicer name on both front and rear driving axles, transfer case, drive shafts and universal joints means maximum power and efficiency.

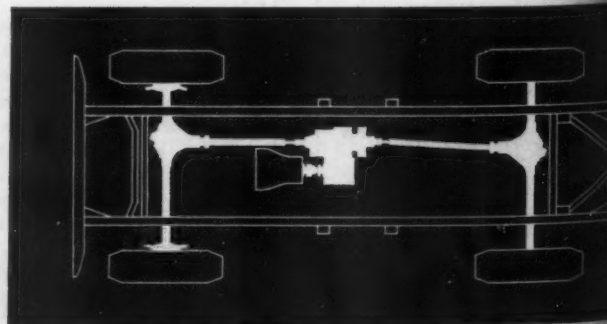
Specify Spicer for 4-wheel drive units, for maintenance-free performance, and for immediate parts availability—anywhere in the country!



Spicer front drive axles have been job-proven by over a quarter-century of rugged use in both civilian and military vehicles.

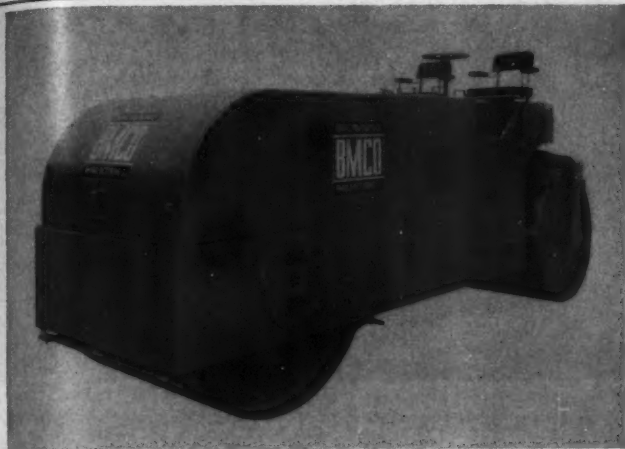


Special Spicer rear axle design and construction assure precision alignment of gears and bearings at all speeds and load conditions for quieter operation.



Power-Matched . . . Spicer complete four-wheel drive assemblies are designed to work together for dependable, full power traction.





The new Browning 8 to 12-ton tandem roller offers automotive-type power steering with wheel for fast, easy driving.

#### Roller line features 8 to 12-ton model

The Browning Mfg. Co. announces a new line of tandem rollers featuring an 8 to 12-ton model. In addition, the firm offers 8 to 10-ton and 5 to 8-ton models, and a 3 to 5-ton portable will be available soon.

The new 8 to 12-ton tandem offers automotive-type power steering with wheel for fast, easy, accurate driving. The 240-gallon water tank has a large 4-inch plug for rapid filling. A choice of gasoline or diesel engine with powerful torque converter is offered with Revers-O-Matic single-

lever control on the four speeds forward and four reverse.

Ballast may be easily loaded through the extra-large plates on both sides of both drums. Guide and drive rolls are built on antifriction bearings, and extra-duty brakes insure fast stops. Minimum overhang reduces hand work to within 5 inches of walls.

For routine servicing, the entire rear cowl is quickly removable.

For further information write to the Browning Mfg. Co., Dept. C&E, P. O. Box 2707, San Antonio, Texas, or use the Request Card at page 18. Circle No. 58.

#### Adds 100-watt unit to 2-way radio line

Motorola has further expanded its transistorized line of Motrac 2-way radios with the introduction of a 100-watt unit to operate in the low band (25 to 54 mc) frequencies.

Like other models, the 100-watt unit will accommodate either positive or negative vehicular battery ground polarity.

For further information write to Motorola, Inc., Communications and Industrial Electronics Division, Dept. C&E, 4501 W. Augusta Blvd., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 77.

#### Improved electric plants lighter, more powerful

Pacific Mercury has redesigned its 1,750, 2,000, and 2,500-watt electric plants, reducing the weight of these generators by 25 pounds and increasing horsepower from 10 to 15 per cent.

All three of these plants have, as standard equipment, six receptacles for multiple operation of power tools and other equipment, electric start, high-low battery charge on all ac models, rpm indicator, and cast-aluminum skids. Shock-absorbing skids are available if desired.

For further information write to Pacific Mercury Mfg. Corp., Marketing Division, Dept. C&E, P. O. Box 190, North Hollywood, Calif., or use the card at page 18. Circle No. 137.

# cheaper 4-Wheel Drives Like Toughest Terrain!



WRITE Dana for further information on 4-wheel drives.  
Please describe your application and include load data.



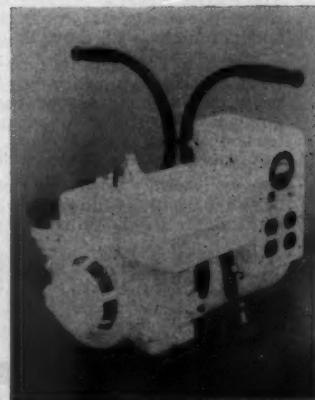
# DANA

## CORPORATION

Toledo 1, Ohio

Heavy Transportation—Transmissions • Auxiliaries • Universal Joints • Clutches • Propeller Shafts • Power Take-Offs  
Torque Converters • Axles • Power-Lok Differentials • Gear Boxes • Forgings • Stampings • Frames • Railway Drives  
Many of these products are manufactured in Canada by Hayes Steel Products Limited, Merriton, Ontario

For more facts, use Request Card at page 18 and circle No. 367





Attached and removed in minutes by one man, Little Giant's front-mounted sweeper can be mounted on any type of tractor, truck, Jeep, or similar prime mover. A simple mounting bracket is easily installed. The brush angles about 30 degrees right or left. Power is supplied by a Wisconsin air-cooled engine of 7.4, 11.5, or 15.2 horsepower. The sweeper, which is 51 inches high, comes in 6, 7, and 8-foot lengths. The brush is 31 inches in diameter. For further information write to Little Giant Products, Inc., Dept. C&E, 1530 N. Adams St., Peoria, Ill., or use the Request Card at page 18. Circle No. 8.



### Excavators, cranes have improved design

Hanson excavators and cranes for 1960, in  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{3}{8}$ -cubic-yard capacities, crawler and truck-mounted, have new design features that improve performance, simplify maintenance, and ease operation.

Major changes involve the drum clutches, torque booster control bands, and drum brakes. The clutch band is easier to engage, simpler to adjust, and transmits more power. Torque booster control bands are of a hinged type said to be much more durable and efficient, further aiding

clutch engagement.

Drum brake bands and controls are completely redesigned for simplification to decrease linkage and at the same time increase power and improve "feel" of the load.

Suspended push-type pedals and an upholstered adjustable seat with cushioned back rest add to comfort.

For further information write to The Hanson Clutch & Machinery Co., Dept. C&E, 2000 Miami St., Tiffin, Ohio, or use the Request Card at page 18. Circle No. 140.

### Wall-type file available for blueprints, drawings

Lewbill Industries, Inc., announces a wall-type file for the handling and storage of blueprints, drawings, and other large sheet materials.

Known as the Martin sheet file system, this unit allows the user to work efficiently with a large number of prints because each sheet hangs flat, requiring less storage space and eliminating curl.

Construction is of a steel-tube frame hinged to a plywood mounting panel, with locking hinge support arms. A special feature of the file is

the new rubber-tipped lock clips used to mount sheets in the clamp hangers. Many prints can be clamped firmly in each hanger.

Martin units are available in two sizes: Model 30, which will hold sheets up to 30 inches wide, and Model 42 for sheets with a 42-inch maximum width.

For further information write to Lewbill Industries, Inc., Dept. C&E, 24 Spring St., Scottsdale, Pa., or use the Request Card at page 18. Circle No. 146.

Husky 9.2-hp  
**WISCONSIN**  
powers 2½-ton  
vibrating  
roller

New Vibra-Tow  
sub-base rollers,  
made by Rosco Mfg. Co.,  
Minneapolis, Minn.



### Here's rugged power for your toughest jobs!

The one-cylinder Wisconsin Engines powering the Vibra-Tow rollers are small — but they are long on service. And that's what makes heavy-duty construction equipment pay off.

The Model AENLD engines are designed to give the most service with the least care. They are precision-fitted for smooth-firing power and minimum wear. And they have the ruggedness to absorb the grueling punishment of day-in, day-out compacting roller service.

Look at these heavy-duty long-life features: Each Wisconsin has tapered roller bearings on both ends of the crankshaft; four piston rings; pump-circulated lubrication; and an outside weather-sealed high-tension magneto for fast starts. Stellite-faced exhaust valves and inserts and positive rotators extend valve life up to 500%.

It pays to specify Wisconsin Engines on the equipment you buy. Sizes from 3 to 56 hp — with electric starting available for all models. Send for Bulletin S-249. Write to Dept. C-20.

C-146



**WISCONSIN MOTOR CORPORATION**  
MILWAUKEE 46, WISCONSIN  
World's Largest Builders of Heavy-Duty Air-Cooled Engines

For more facts, use Request Card at page 18 and circle No. 368



### Save Time...Save Wire ...Increase Production... with the IDEAL REEL

Wherever wire is applied and tied—for re-bars, metal lath, insulation, warehouse bundling, and many other uses—the IDEAL TIE WIRE REEL will save you up to 33 per cent in wire and speed tying by 25 to 30 per cent.



Right or left hand use . . . refills in seconds . . . handles 12 to 20 gauge wire . . . lasts indefinitely. Handy four pound wire coils are available everywhere in:

- Black Annealed
- Copper Clad
- Monel
- Galvanized Soft
- Stainless Steel
- Aluminum

. . . to suit every job requirement. Get the Ideal Reel success story and demonstration from your dealer or write for full information today!



**IDEAL REEL COMPANY**  
PADUCAH, KENTUCKY

For more facts, use Request Card at page 18 and circle No. 369

CONTRACTORS AND ENGINEERS



As the tractor-drawn fence-erecting machine rolls on to the next post location, woven wire and one strand of barbed wire are strung out vertically.

### Machine builds fences with one-pass operation

A new machine for fence building is available from the American Steel and Wire Division of the U. S. Steel Corp.

According to the company, with this machine, erecting a wire fence is a one-pass operation for a 2-man crew. Posts are driven into place, eliminating the chore of digging holes. As the tractor and fence erector are driven ahead to the next post location, woven-wire fencing or the woven wire and a strand of barbed wire are paid out vertically. Where barbed wire only is needed, as many as five strands can be dispensed.

After three or four posts are driven, a hydraulically operated clamping mechanism holds the wire for stretching. The unit is driven forward to provide the proper tension.

The fencing is then attached to the posts, and the erection sequence is repeated.

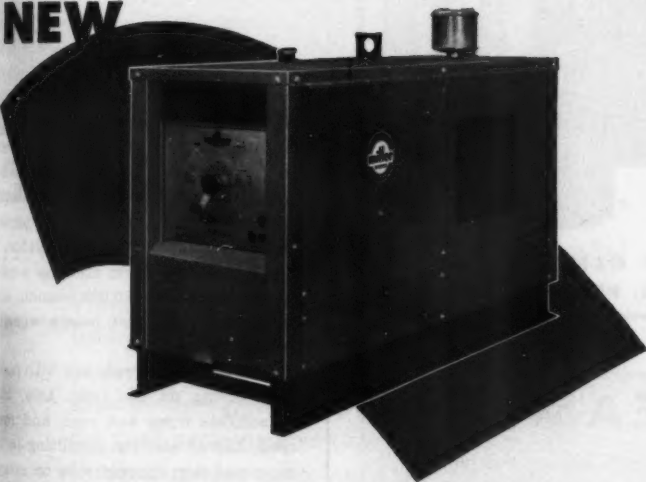
The fence-erection unit can straddle a straight line when both posts and fencing are being erected at the same time, or can be adjusted so that the tractor and equipment operate adjacent to a line of existing posts.

The unit is readily attached to a tractor by a special hitch that holds the unit horizontally rigid but hinged for free vertical movement. With this feature, it is easy to follow a guide line over rough ground.

For further information write to the U. S. Steel Corp., American Steel & Wire Division, Dept. C&E, 1420 Rockefeller Bldg., Cleveland 13, Ohio, or use the Request Card at page 18. Circle No. 115.

To obtain further information on any of the products described in this section, circle the number given at the end of the item on the handy Request Card that is bound in at page 18 of this issue.

## NEW



### Miller Welder/Power Plant Reliability now available with Diesel Economy and Safety

Hercules 38 h.p. 3 cylinder direct injection diesel engine drives new Miller DD-250-L d-c welder/a-c power plant, which delivers:

Two d-c welding ranges: 50-200 amperes, 150-350 amperes

Duty Cycle: 100%

Rated output: 250 amperes d-c at 40v, 100% duty cycle

Maximum open circuit voltage: 65

Current adjustment steps: infinite

Power: 12 KW, 115/230v single phase, 60 cycle a-c. Up to 6.5 KW a-c while welding. 1 KW, 115v auxiliary d-c power while welding.

Complete details and engine specifications will be sent promptly upon request.

**miller**

ELECTRIC MANUFACTURING CO., INC. • APPLETON, WISCONSIN

Distributed in Canada by Canadian Liquid Air Co., Ltd. Montreal

For more facts, use Request Card at page 18 and circle No. 370



## Lower the Cost of Concrete Construction

Place structural concrete anywhere on the job at great savings. New AIRPLACO Concrete Placers provide a low-cost, highly flexible method of conveying and distributing concrete. Keep transit-mix trucks out of the mud. Get a better concrete pour in those hard-to-get-to points, quickly, easily, and best of all, profitably.

### COMPLETE LINE



PLACERS  
Model  
CP-15



GUNS



MIX-ELVATORS



SANDBLASTERS



GROUTERS

### ADVANCED DESIGN FEATURES

- Handles All Standard Mix Structural Concretes and Lightweight Concretes
- Easy to Operate
- Perfect for Big and Small Jobs—production range up to 30 cu. yds. per hour
- Portability To and From the Job
- Mobility On the Job

### A Free Service For You

Our engineering and technical staff is available at anytime for consultation. Our years of experience have saved thousands of dollars for others. Let us help you. Write, wire or phone when you have a problem.

### Plus FREE BROCHURE



For more facts, use Request Card at page 18 and circle No. 371



### Railroad car shakeout anchors in the ground

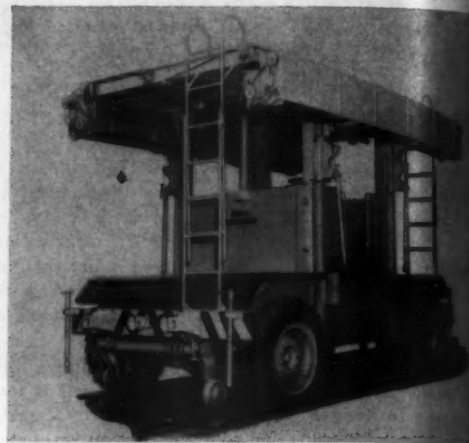
Hewitt-Robins, Inc., has added a new railroad-car shakeout to its line of material-handling equipment.

Called the Trackside, the machine is mounted in a fixed position alongside the railroad track where hopper cars, either open or covered, are to be unloaded. A powerful hydraulic cylinder, exerting a force of 14 tons, pushes a vibrating head against the side of the car; this shakes the entire car and causes compacted or frozen material to loosen and flow down through the hoppers.

The shakeout is anchored in the ground and is push-button controlled for safe remote operation. No man-handling of a heavy suspended weight is required.

The new unit weighs 2,400 pounds, has a 7½-hp high-torque vibrator drive, and a 3-hp high-torque pump drive.

For further information write to Hewitt-Robins, Inc., Dept. C&E, 666 Glenbrook Road, Stamford, Conn., or use the Request Card at page 18. Circle No. 122.



The Athey motorized scaffold can expand into a full-size work platform as high as 14 feet 6 inches off the ground.

### Motorized scaffold travels at 20 mph

A motorized scaffold for transporting men and materials in and out of tunnels or to other normally inaccessible high areas, and which expands into a full-size work platform as high as 14 feet 6 inches off the ground, is announced by the Athey Products Corp.

Called Moto-Scaffold, the unit moves on rubber tires or can be towed on automatic guides. It travels in and out of tunnels at speeds up to 20 mph, forward or reverse. At the job site, four stabilizer jacks are lowered, and the main platform is raised hydraulically to the desired level. The side scaffolds unfold at each side to provide a space 18 feet 1 inch wide and 14 feet long. They work independently, if desired, to give the main platform—three separate work platforms of varying heights.

The main platform area has a carrying capacity of 10,000 pounds; the folding scaffolds each have a capacity of 2,000 pounds.

The machine is equipped with power steering on the front axle, two headlights front and rear, and foot pedestals to seat the stabilizing jacks and give firm support even on rough ground.

For further information write to the Athey Products Corp., Dept. C&E, 5631 W. 65th St., Chicago 38, Ill., or use the Request Card at page 18. Circle No. 91.

### Add submerged-arc wires to hardsurfacing line

A new line of hardsurfacing wires for submerged-arc automatic application is announced by the Alloy Rods Co.

These Wear-O-Matic wires are fabricated wires, precision-cold-drawn to a tolerance of plus or minus 2/100 inch, compressing the filler metal to a near solid. Six alloys are available in ¼, 5/32, and 3/16-inch diameters.

For further information write to the Alloy Rods Co., Dept. A-23, Dept. C&E, P. O. Box 1828, York, Pa., or use the Request Card at page 18. Circle No. 142.

## HERE'S SPRAGUE & HENWOOD'S TIME & MONEY SAVER

### EXAMPLE:

Have you ever found, after a concrete floor was finished that sleeves had been set in the wrong place, or that they had moved during the pouring? Have you ever found that you needed additional holes for which no sleeves had been set? If you have then you know there should be an easier way to spot and make these holes—**HERE IT IS!** Sleeves could be eliminated, and floors poured solid. Then the required holes can be spotted accurately, and drilled cleanly... smoothly... quickly and in the required diameter with Sprague & Henwood Masonry diamond bits. Re-inforced concrete presents no problem.

Other ways to save time and money are to use Sprague & Henwood Masonry diamond bits in drilling holes in glass... ceramic tile... brick... stone... concrete... asphaltic concrete, plus many other hard or brittle materials. Sprague & Henwood manufactures three types of Masonry diamond bits: Resettable—Throw-Away—Impregnated.

Write today for more information on how you can save money... save time... and in the final result make more money for yourself or your firm.

Look for our emblem... It's your Seal of Quality

**SPRAGUE & HENWOOD, Inc.**



**221 WEST OLIVE STREET  
SCRANTON, PENNSYLVANIA**

For more facts, use Request Card at page 18 and circle No. 372

## A CRACK DRILL TEAM...

An experienced foundation contractor, a Williams earth boring machine, and a proficient operating crew make a crack drill team for installation of drilled piles and drilled caissons. Whether the holes are vertical or battered, skin friction or end-bearing straight shaft or underreamed, a Williams digger will outproduce all others.

In addition to the complete Williams line of standard earth boring equipment, the Hugh B. Williams Mfg. Company specializes in the design and fabrication of special drilling equipment for contractors encountering unusual shaft sinking problems.

Manufactured by  
**HUGH B. WILLIAMS MFG. CO.**  
8330 Lovett Ave.  
P. O. Box 7815 • Dallas, Texas

Write Exclusive Distributor  
**JOSLYN MFG. & SUPPLY CO.**  
2101 Corinth St. • Dallas, Texas  
for DESCRIPTIVE LITERATURE

For more facts, use Request Card at page 18 and circle No. 373



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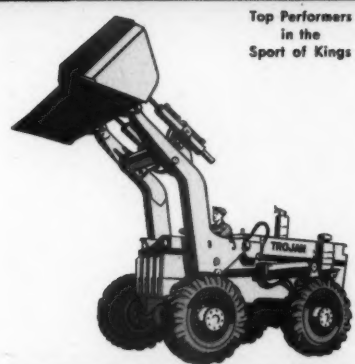
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D ENGINE



# Top Performance . . . ...on the turf—or on the job!

From the recognized leader in every field you come to expect flawless performance . . . So it is with Trojan tractor shovels—recognized “top performers” under the most exacting operating conditions. Compare performance—you will see why TROJAN is “Tops”!



Top Performers  
in the  
Sport of Kings

## TROJAN

**TROJAN®**  
TRACTOR SHOVELS  
YALE & TOWNE

TROJAN TRACTOR SHOVELS ARE AVAILABLE IN 8 MODELS, LIFTING CAPACITIES FROM 6,000 TO 24,000 LBS.  
**THE YALE & TOWNE MANUFACTURING COMPANY**  
TROJAN DIVISION • BATAVIA, NEW YORK

©YALE & TOWNE MFG. CO.



# Designed for today's concrete placement techniques

Uni-Form Panels have changed over the years to keep pace with modern concrete forming practice.

Today's Uni-Form Panels weigh a little more (about  $\frac{1}{2}$  lb. per foot) than other pre-fab form panels because *they are designed and built to meet today's requirements.*

We know that if the assembled concrete form is to have the structural rigidity necessary to withstand today's concrete placement techniques and high rates of pour, the individual panels which make up the form must have great inherent strength.

We produce the strongest form panel we know how to build. The great strength—and extra weight—of Uni-Form Panels is due almost entirely to the special "T" section steel frame which supports the struts or load bearing members of the panel.

Most specification concrete does not permit deflection in the forms. If the form panel does not have the strength to take the stresses imposed by normal concrete construction practices, it is a liability that can cause serious problems.

Uni-Form Panels are designed to take the full strength of the tie, plus a wide safety factor to avoid any possible deflection or permanent set in the load bearing member. Concrete formed with Uni-Form Panels will be straight and true.

Because they are so strong, you don't have to "baby" Uni-Form Panels. *You don't have to make major changes in your method of handling and placing concrete.* You can apply the heaviest practical pressures and highest pouring rates to a Uni-Formed concrete form with assurance that it will stand up and take it.

When you rent or buy any pre-fab form, it will pay you to consider carefully what you're getting. If you want a panel that is built to give you maximum forming speed, economy, efficiency, and service life—look to Uni-Forms. More contractors are using them every day because Uni-Forms deliver where it counts . . . on the job.

**Write for the UNI-FORM Panel Catalog. It contains complete details on the industry's most modern and flexible concrete forming system.**

UNIVERSAL FORM CLAMP CO.

*"Products from the Gold Tool Room"*  
1238 N. KOSTNER AVENUE • CHICAGO 51, ILLINOIS

**BRANCH OFFICES and WAREHOUSES:**  
ATLANTA    BALTIMORE    CLEVELAND    HOUSTON  
LOS ANGELES    SAN LEANDRO    TORONTO

For more facts, use Request Card at page 18 and circle No. 375



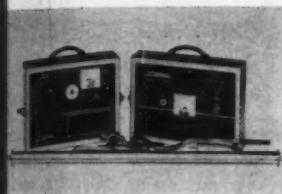
Larger legal loads are possible because of the lightweight construction of this Diamond T Model 838R-32M V-8 powered six-wheeler. Ten different tandem rear axles are available on the 838R Series, ranging in capacity from 34,000 to 50,000 pounds. Front axles to 15,000 pounds can be supplied. A total of thirteen transmissions and auxiliary transmissions may be specified. Gcw rating of the 838R goes up to 78,000 pounds, and gvw rating with oversize front axle and heaviest tandem is 60,000 pounds. For further information write to the Diamond T Motor Truck Co., Dept. C&E, 4401 W. 26th St., Chicago, Ill., or use the Request Card at page 18. Circle No. 109.



### Transistor pipe detector uses standard batteries

A new transistor pipe detector, the Electron Model 808, is announced by the Computer Measurements Co. The staff of the 808 is said to be unusually sharp, thus assuring separate detection of pipe lines lying close together.

According to the manufacturer, the 808 is designed not only to detect and



trace pipes, cables, and conduits but also locate valve boxes, services, studs, and miscellaneous metallic objects. The depth of a pipe or cable can usually be estimated quickly by triangulation.

Depth range on 1-inch water pipes approximates 10 feet, and maximum depth range of the instrument on large lines is 20 to 25 feet, depending upon soil conditions.

The detector uses standard batteries that require replacement on the average about once a year.

For further information write to the Computer Measurements Co., Division 6, Dept. C&E, 12970 Bradley Ave., Sylmar, Calif., or use the Request Card at page 18. Circle No. 84.

### Two new fastening tools add safety; cut rebound

Two new fastening tools are announced by Ramset Fastening System, Olin Mathieson Chemical Corp. One, called Flite-Chek, is a power-actuated tool designed to provide maximum safety by capturing an overdriven fastener before it leaves the tool. The other is Shure-Drive, a rebound hammer which, with its shock-absorbing materials, makes repetitive hammering easier by reducing rebound.

For further information write to Ramset Fastening System, Olin Mathieson Chemical Corp., Dept. 601, 289 Winchester Ave., New Haven 4, Conn., or use the Request Card at page 18. Circle No. 7.

## Vibrate your way to higher profits with... Maginniss Hi-Lectric Concrete Vibrators

### STRUCTURES



MAGINNISS CONCRETE VIBRATORS speed up pours, cut labor costs, produce blemish-free concrete. Two 180 cycle, 120 volt models; HCV-3 for bridge, pavement and building work; HCV-6 for massive structures. Powered by choice of nine different gasoline or electric driven generators. (Uni-lectric 110 volt universal motor vibrators for smaller jobs, too.)

### FULL SLABS



MAGINNISS INTERNAL FULL SLAB VIBRATOR ATTACHMENT provides uniform vibration of entire slab, boosts production, reduces finishing to one pass. 180 cycle induction motor-in-head vibrators, fully adjustable for any spacing, and for depths of 2 to 35 in. Powered by compact, lightweight engine-generator. Fits all makes of paving machines.

### SIDE FORMS



MAGINNISS SIDE FORM VIBRATOR ATTACHMENT fits all makes of paving machines. Prevents honeycomb, eliminates hand labor, speeds production. 180 cycle induction motor-in-head vibrators, fully adjustable for depth and spacing, choice of instant manual or hydraulic retraction. Generator also powers floodlights and service tools.

### PAVEMENT WIDENING



MAGINNISS PAVEMENT WIDENING VIBRATOR ATTACHMENT fits any widener, eliminates need for accessory vibrating screed or for hand finishing. 180 cycle induction motor-in-head vibrators in hopper plasticize stiffest concrete... permit production rates up to 35 fpm on slip-form paving. Generator also powers service tools, floodlights.

Write for literature—  
or call your nearest  
MAGINNISS Distributor.  
He's listed under...  
"Contractors' Equip-  
ment" in 85 principal  
cities.



Find your nearest  
distributor in the  
"Yellow Pages"

On jobs where profit-conscious contractors are at work, you'll find Maginniss Hi-lectric vibrators in action!

That's because powerful Hi-lectric vibrators with induction motor-in-head design, produce up to 10,500 VPM... cut placing time... produce sounder, better looking concrete at lower cost.

Whether you're pouring footers, building structures, paving highways or airports, it'll pay you to investigate—and use—the profit-boosting features of Maginniss Hi-lectrics. You'll find that Hi-lectric vibrators offer true one-man operation... that they have no cumbersome, hard-to-maintain flexible shafts... that they provide plenty of power to handle stiffest concrete mixes with ease.

Whatever your concrete vibrating needs may be, your nearby Maginniss distributor can recommend... and supply... Hi-lectric vibrators and generators exactly suited to your requirements. Get all the facts today!

AA-402

**MAGINNISS Power Tool Company**  
Dept. CE-40, 154 Distl Avenue, Mansfield, Ohio

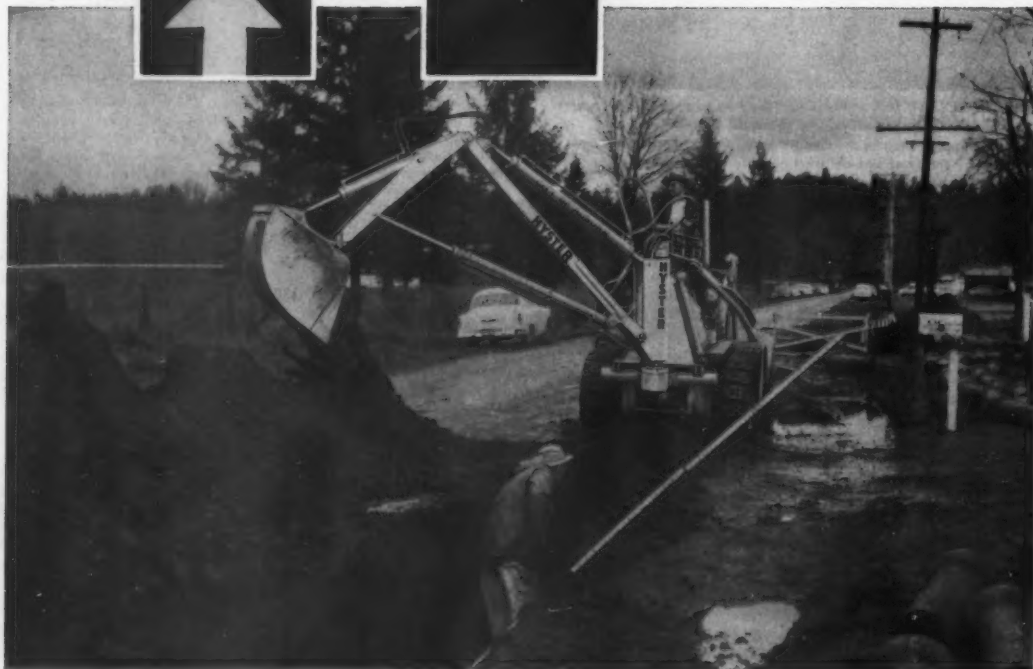


For more facts, use Request Card at page 18 and Circle No. 376





Use of aluminum for this low-bed trailer fabricated by the Vulcan Trailer Mfg. Co., Birmingham, Ala., reportedly saves nearly 5,000 pounds over-all weight per trailer without loss of strength or durability. The unit weighs 7,550 pounds and has a capacity of 20,000 pounds. For further information write to the Vulcan Trailer Mfg. Co., Dept. C&E, Birmingham, Ala., or use the Request Card at page 18. Circle No. 75.



**Dig and backfill**  
with one machine —  
**HYSTER® has it!**

The Hyster Backhoe on a CAT-Built Traxcavator does double duty—digs and backfills—with one operator.

Gives highest production of any tractor-mounted hydraulic hoe.

Ideal for municipal development work.

An economical utility tool for water, gas and sewer trenching.

See your Caterpillar-Hyster dealer for full information.

Caterpillar, Cat and Traxcavator are trademarks of Caterpillar Tractor Co.



**HYSTER COMPANY**  
TRACTOR EQUIPMENT DIVISION  
P.O. Box 328 • Peoria, Illinois

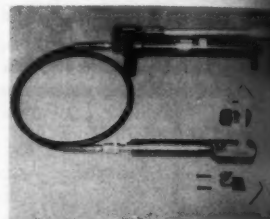
TRACTOR EQUIPMENT DIVISION—Construction and logging equipment  
INDUSTRIAL TRUCK DIVISION—Lift trucks, mobile cranes, straddle carriers  
MARTIN TRAILER DIVISION—Heavy machinery hauling trailers  
INTERNATIONAL DIVISION—Overseas manufacturing, sales and service  
Factories: Portland, Oregon (Home Office) • Danville, Ill. • Peoria, Ill. • Kewanee, Ill. •  
Nijmegen, The Netherlands • Glasgow, Scotland • Sao Paulo, Brazil • Sydney, Australia (Licensee)

For more facts, use Request Card at page 18 and circle No. 437

### Cable cutter and crimper reduces flash hazard

A tool to make safer the cutting of large electric cables located in and around ground vaults and in other confined quarters is announced by The Welsbach Corp.

This cutter and crimper is a small hydraulic ram in which oil pressure



activates a hardened-steel cutting blade. The forward edge of the blade is constructed with a hooklike section which permits the operator to pry the cable away from flat surfaces, separating it from others in the group and which then firmly seats the cable for the cutting process. The cutting blade moves forward under pressure, severing the cable with smooth, clean edges.

The crimping, states the manufacturer, is equally simple and fast.

For further information write The Welsbach Corp., Dept. C&E, 13 Walnut St., Philadelphia, Pa., or use the Request Card at page 18. Circle No. 150.

### Portable batch plant has 6-yard capacity

The Aeroll Products Co., Inc., announces a new portable 6-yard batching plant.

The unit features a 6-yard wheel hopper made of Man Ten abrasion-resistant steel, and a 35-foot-long 18-inch-wide belt conveyor. It is available with beam scales as standard equipment; dial scales are optional. Designed to be towed behind the average pickup truck, it has an over-all width of 7 feet, is 36 feet 6 inches long, and is 11 feet 6 inches high. The plant weighs 6,500 pounds.

A special method of introducing the cement makes the plant easily adaptable for use with bulk or bag cement, according to Aeroll.

For further information write the Aeroll Products Co., Inc., Dept. C&E, 19 Wesley St., South Hackensack, N. J., or use the Request Card at page 18. Circle No. 26.

CONTRACTORS AND ENGINEERS



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GOSHEN, INDIANA — Rieth-Riley has purchased more than 35 Huber-Warco rollers during the past 28 years. This 8-12 ton tandem is one of their fleet of Huber-Warco tandem rollers. It is compacting the wearing course on a street in Battle Creek, Michigan. The company is most active in northern Indiana-Michigan area.



# HUBER-WARCO

## *tandem rollers*

3-5 ton 4-6 ton retractable 5-8 ton 8-10 ton 8-12 ton 10-14 ton

**DRIVE FEATURES** — Water-cooled torque converter cushions against shock. Tailshaft governor maintains desired speed regardless of grade for easy, accurate control. Two-speed transmission\* prevents loss of efficiency in tailshaft governor or hydraulic steering at all rolling speeds.

**KING OF KINGPINS** — Complete freedom from kingpin and swivel pin looseness. Tapered roller bearings permit "like-new" adjustment. No road scuff in reversing. Kingpin and housing easily removable.

**CONTROL FEATURES** — Variable hydraulic control adjusts to steering "feel" best for operator. Dual controls. Parking brake system completely independent.

**PERFORMANCE PLUS** — Work within less than 2 inches of buildings. Unsurpassed visibility. Final drive mounted in the frame, not on it, for longer shaft, gear and bearing life.

\*Except for 3-5 ton and 4-6 ton models.

*A trusted product name backed by respected distributor names from coast to coast*



MOTOR GRADERS

Standard transmission models from 83 to 160 H.P. Torque converter and power shift transmission models from 102 to 195 H.P.



TANDEM ROLLERS

3-5 Ton • 4-6 Ton Retractable • 5-8 Ton • 8-10 Ton • 8-12 Ton • 10-14 Ton



3-WHEEL ROLLERS

10-Ton • 12-Ton • 14-Ton Standard Weight 10-12 Ton • 12-14 Ton Variable Weight



MAINTAINER

M-52 — 45½ H.P. Attachments are Lift-Loader, Broom, Bulldozer, Patch Roller, Scarifier, Snow Plow, Berm Leveler

**HUBER-WARCO COMPANY**

**Marion, Ohio, U.S.A.**



Flotation tires, when used on the 4-wheel-drive Topeka mower, permit the mowing of steep slopes, wet ditch bottoms, and marsh areas previously mowed only by hand. The Topeka Forty Mile mower pictured is now available with 36x20 low-pressure Terra tires. Quickly interchangeable with regular high-pressure tires, they can be used on any Topeka mower, including the front-mounted hammermill, side-mounted rotary, or straight sickle-bar models. For further information write to Topeka Hiway Mower, Inc., Dept. C&E, P. O. Box 720, Topeka, Kans., or use the Request Card at page 18. Circle No. 68.



This  
**IGLOO**  
is at work  
saving money!

Yes, IGLOO Water Coolers will save you money. They keep more men on the job more of the time, pay off in employee relations and require no maintenance other than the rinsing any drinking container would require. There should be an IGLOO strategically located for every six to eight workers.

- **IGLOO** is PERMALINED to keep liquids pure
- **IGLOO** has an easy-to-clean round inside bottom
- **IGLOO** is stronger, lasts longer
- **IGLOO** has been proven in use—thousands of times

When you order water coolers specify IGLOO

IGLOO, world's No. 1 Water Cooler, is available in 2, 3, 5, 10 and 15 gallon sizes—23 models in all.



For more facts, circle No. 381

### Heavy-duty power tamper features 18-inch shoe

The Kelley Machine Division announces the Model 18 KTH heavy-duty power tamper with an 18-inch shoe.

Kelley power tampers are equipped with roller-bearing engines driving massive eccentric loaded rotors. When the eccentric rotor system is operated at the recommended speed, the whole machine is picked up, moved forward, and rammed down in short, rapid, continuous cycles.

Kelley power tampers are self-propelled, moving themselves forward up to 80 fpm.

For further information write to the Kelley Machine Division, Wiesner-Rapp Co., Inc., Dept. C&E, 285 Chicago St., Buffalo 4, N. Y., or use the Request Card at page 18. Circle No. 104.

### Portable masonry saws for wet or dry cutting

A new portable masonry saw is announced by the Champion Mfg. Co.

Called the Tak-A-Bout Jr., the saw is designed for use on scaffolds, on the back of a truck, or on a work bench.

The unit is available with a 1 and 1½-hp fan-cooled motor. It features 14-inch blade-guard capacity, a self-priming pump, a diamond lock, and a removable mandrel.

Both wet and dry cutting models are available, and the saw can use abrasive or diamond blades.

For further information write to the Champion Mfg. Co., Dept. C&E, 3700 Forest Park Ave., St. Louis 8, Mo., or use the Request Card at page 18. Circle No. 38.



**GOOD ROADS "ODELL" SPREADER**  
with automatic shut off gate

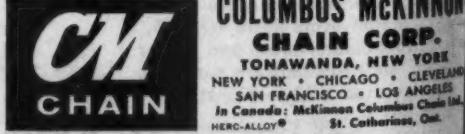
### ...for asphalt and aggregate spreads up to 8-inch depths

Operated by only two men, contractors report savings up to 50% on average jobs with the "Odell". Spreads asphalt, gravel, coarse slag or stone, limestone, cinders, and other base material (up to 4" in diameter) to 8" in depth. Adjustable for spread widths up to 10 feet.

Accurate spread depth is controlled by the exclusive "floating" strike-off bar with new crown adjustment, mounted on runners independent of the roller and hopper. Automatic shut-off eliminates dribble and material pile-up at end of each pass.



For more facts, circle No. 382



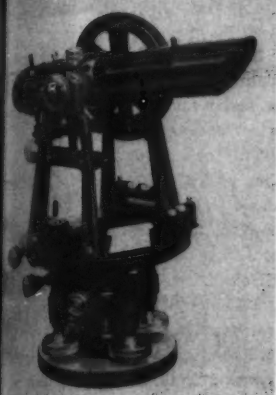
For more facts, circle No. 383

CONTRACTORS AND ENGINEERS



### Optical plummet transit sets up more accurately

A new optical plummet transit, the Fennel Model 110, said to eliminate dependence on the plumb bob when setting up in the wind—and give greater setting accuracy, is announced by the Fennel Instrument Corp. of America. The optical plummet rotates with the instrument, making it possible to



from check on the point, and it focuses for both short setups and deep

The shifting-head tripod supplied with the new Fennel instrument has the usual shifting distance, states the manufacturer. The tripod screw threads are standard, and a locking device on the leveling head can be temporarily lifted to permit standard shifting when the instrument is used on any other standard tripod. The telescope has a reversion bubble, side focusing, and a gun sight.

For further information write to the Fennel Instrument Corp. of America, Dept. C&E, 50 Colfax Ave., Clinton, N. J., or use the Request Card that is bound in at page 18. Circle No. 145.

For more facts, circle No. 385→

Two basic changes are announced in the redesigned Hopto Model 110 snap-mount backhoe. As shown in the photograph, the operator now sits over the unit instead of behind it. The seat swivels or pivots with the action of the boom for better control and improved visibility. The second major change in the new model is an improved and more rugged swing mechanism with two double-acting swing cylinders. For further information write to The Warner & Swasey Co., Dept. C&E, 5701 Carnegie Ave., Cleveland, Ohio, or use the Request Card at page 18. Circle No. 138.



## a brand new 5 year old!

*Here are just a few of the many features that put this new C-6 "Euc" years ahead of competitive crawlers:*

**Proven Torqmatic Drive**... performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

**Full Power Shift**... no master clutch... easy operation and "fast as a fox" maneuverability that cuts work cycle time.

**Low Maintenance Costs**... easy accessibility of major components... no adjustment of steering clutches and brakes required... fewer lube points... dry type air cleaner... 7 track rollers... no tractor weight on final drives... recoil system eliminates mechanical springs.

No other Euclid product has ever had the thorough testing—both on proving grounds and on actual jobs—that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

**Fast, Positive Response**... common steering and braking control, plus Torqmatic Drive for smooth operation on all tractor work.

**Better Track Alignment**... track roller frames are pivot mounted ahead of final drives... advanced design of front equalizer bar maintains positive alignment.

Have your Euclid dealer give you the facts and figures on the C-6... compare performance as well as specs with any tractor in its class and you'll see what this new standard of tractor versatility can mean to you in better production and return on investment.

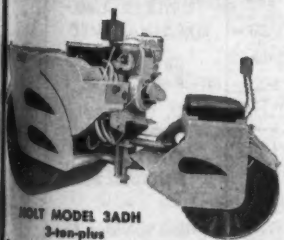
EUCLID Division of General Motors, Cleveland 17, Ohio



## EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

### HOLT ROLLERS



HOLT MODEL 3ADH  
3-ton-plus  
Comp. PSI 240 lbs. at 1 1/4"

### FAST, ECONOMICAL, EFFICIENT COMPACTION

- Portable
- Short-turning
- 12 1/2 h.p. converted by HOLT
- HYDRO DRIVE to 2-speed transmission
- Meets State specs. for highway patching
- Hydraulic center-point steering
- Electric starting
- Ideal for parking areas
- 3 sizes from 1/2 ton to 3 ton

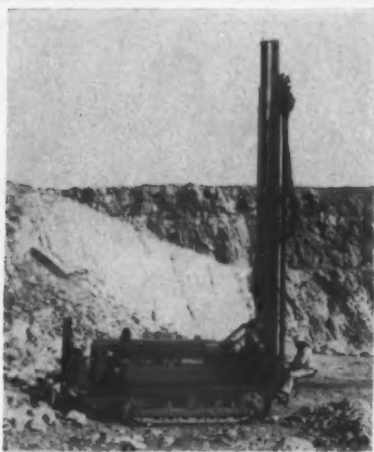
Write for literature and nearest dealer

### HOLT

Independence 4, Oregon

For more facts, circle No. 384





Not only does the operator ride on the new Rotadrill when moving from hole to hole, he can also drill to a depth of 20 feet without leaving his seat.

### Self-contained rotary is one-man operated

A completely self-contained single-unit drill rig known as Rotadrill Model C42 is announced by Schramm, Inc. Drilling equipment, air compressor, and drill-steel capacity for 60-foot-deep holes are all included on a single self-propelled crawler.

The rig is designed for one-man operation. All controls for drilling and driving are placed in front of a sulky seat that is mounted on the crawler at the drilling station.

The crawler tracks have a spread of 7 feet 8 inches, which permits moving from hole to hole under most conditions with the mast in the vertical drilling position.

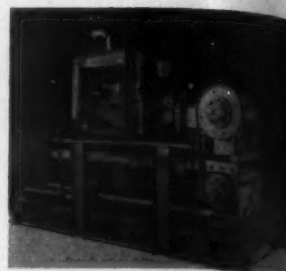
Hydraulic power is featured throughout. The C42's compressor produces 250 cfm of free air at 100 psi.

Using a 3 3/4-inch drill steel, the C42 can drill 4 1/2-inch holes to a depth of 300 feet. With a tri-cone bit, its average penetration rate is said to be 12 to 15 feet per hour in limestone. With the Schramm Rotatool, its penetration rate ranges from 15 feet per hour in trap rock to 25 feet per hour in limestone. The hole size can be increased to 6 inches with the use of a 4 1/2-inch drill steel. Holes up to 3 inches in diameter can be drilled to a depth of 500 feet with 2 1/2-inch drill steel.

For further information write to Schramm, Inc., Dept. C&E, 900 E. Virginia Ave., West Chester, Pa., or use the Request Card at page 18. Circle No. 102.

For further information on any product described in this section circle the indicated number on the Request Card at page 18.

### Machine bores, installs pipe under highways



Installation of pipe under streets, highways, and railroads is claimed to be faster and easier with the Young unified underroad boring machine.

This new model is available with the power unit mounted directly above the boring unit. The operator now has unobstructed vision and full control of the boring operation from all sides.

The 35-hp power unit, with 4-speed transmission and reverse, is mounted on its own pipe skid base and is easily removed from the boring unit when desired. This feature is said to facilitate installation of the machine in the pipe-line trench, as well as its removal.

The Young unified underroad boring machine operates on the rotary drilling principle. It bores and installs, in one operation, casing 18 to 30 inches in diameter and, in limited lengths, 36-inch-diameter casing.

The manufacturer states that the machine will bore, with exceptional accuracy, through sand, gravel, clay, slate, concrete, timbers, and rock formations.

For further information write to the Young Engine Corp., Dept. C&E, 2108 Allen Ave. S. E., Canton, Ohio, or use the Request Card at page 18. Circle No. 123.

**PLAN HOLD**  
VERTICAL AND ROLL  
**Filing Systems**  
FOR PLANS, PRINTS,  
DRAWINGS  
SAVE SPACE

In only 24 linear inches you can file up to 1200 large sheets. Rack easily mounted on any wall at height determined by length of sheets.

#### SPEED USE

When plans are used by 2 or more people or departments, the PLAN HOLD Rolling Stand is a great convenience. Glides on ball-bearing casters.



#### PREVENT DAMAGE



Steel cabinets in modular sizes give extra protection to valuable plans. This Combo Cabinet is equipped with 48 roll file tubes. Also available with vertical files for up to 1200 sheets.

PLAN HOLD equipment brings engineering efficiency to filing and use of all large sheets. Distributed nationally through engineering supply and office equipment dealers. Return coupon for illustrated catalog and prices.

PLAN HOLD CORPORATION  
5204 Chakemco St., South Gate, Calif.

Please send catalog No. 603. I am interested in vertical ☐ or roll files ☐.

Your name \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

For more facts, use coupon or circle No. 386

## ROCKFORD



### FOR RUGGED WORK AND RUGGED QUALITY SPECIFY THE NEW ROCKFORD 'RT' CLUTCH

The tremendous power needed by this heavy "International" transit vehicle, equipped with a concrete mixer, is being supplied by a NEW ROCKFORD "RT" CLUTCH. Using the patented principles of ROCKFORD CLUTCH'S advance research, makes the NEW "RT" Clutch give far greater efficiency for a longer life span. The tremendous torque grip and power that is needed for smooth operation is always available in ROCKFORD CLUTCHES.

Specify the NEW ROCKFORD "RT" CLUTCH to achieve an even greater degree of customer satisfaction. Let ROCKFORD'S advance research help you with today's designs. SPECIFY "ROCKFORD CLUTCHES."

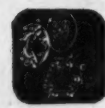
SEND FOR THIS HANDY BULLETIN Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

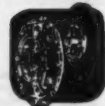
314 Catherine St., Rockford, Ill., U.S.A.  
Export Sales Borg-Warner International — 26 So. Wabash, Chicago 3, Ill.

## CLUTCHES

For more facts, use Request Card at page 18 and circle No. 387



Small Spring Loaded



Heavy Duty Spring Loaded



Oil or Dry Multiple Disc



Heavy Duty Over Center



Power Take-Offs



Automotive Spring Loaded

### FOUNDATION CONSTRUCTION

### CAISSONS

DRILLED AND UNDERREAMED

### PIERS

SPECIAL DRILLING PROBLEMS

Offices in Atlanta, Ga., Pittsburgh, Pa., Washington, D.C., Cleveland, Ohio

Wire or phone for a quotation on your next foundation job — ANYWHERE IN THE WORLD

### McKINNEY DRILLING COMPANY

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Ph.: LOgan 4-8373 • P. O. Box 190

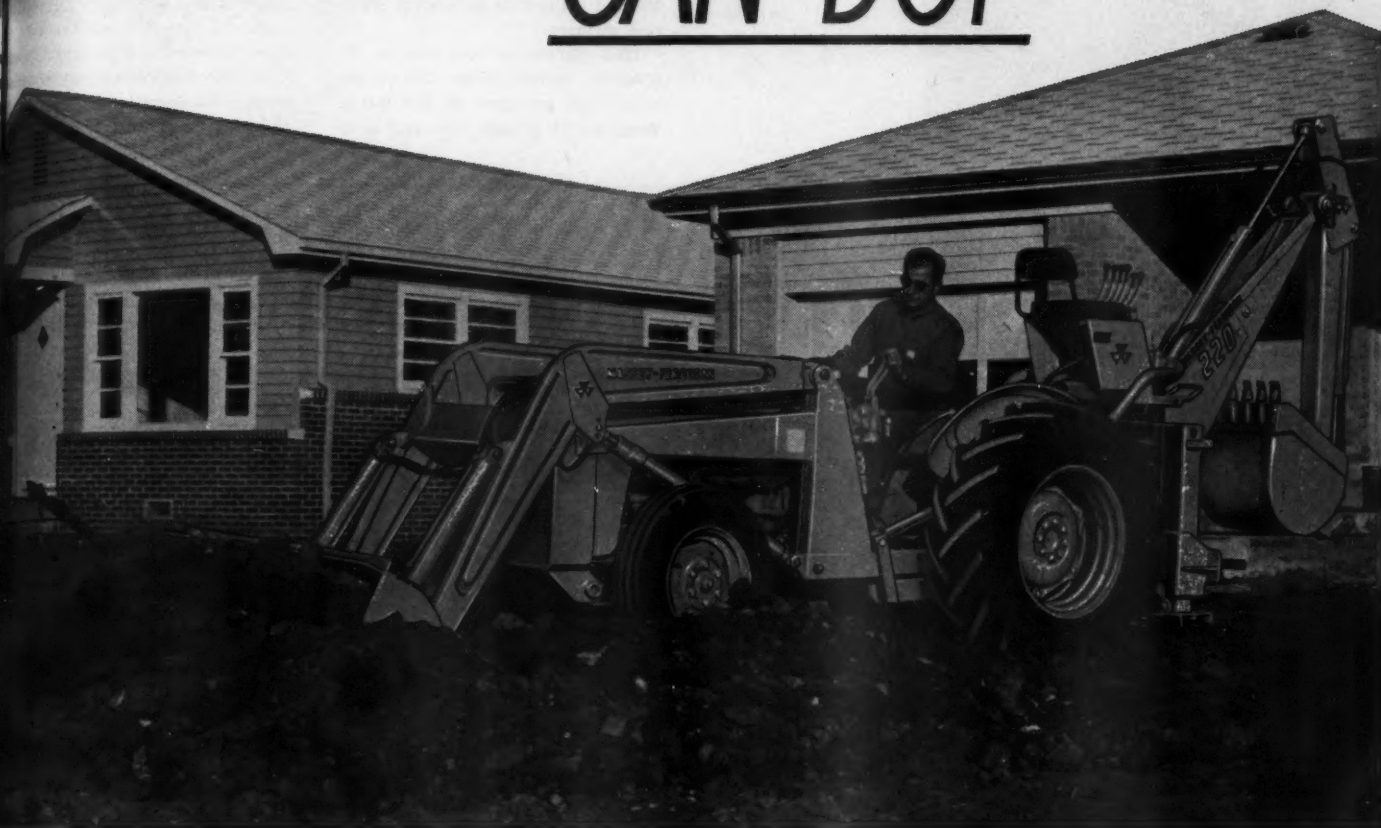
For more facts, circle No. 388

CONTRACTORS AND ENGINEERS



for time saving maneuverability in tight corners  
**the MASSEY-FERGUSON 204**  
 speaks for itself:

**"HAVE DONE... CAN DO!"**



because it has exclusive

**INSTANT  
REVERSE**

with **TORQUE CONVERTER**

Never has a contractor had such a maneuverable and versatile tractor as the Massey-Ferguson 204!

In landscaping, loading, clean-up, or stockpiling it has no equal because of its exclusive Instant Reverse. It means you can change directions of travel by a touch of the foot pedal. Think of the speed you have in moving in and out of congested areas...or in going from load to dump. With no shifting, clutching, or levers to pull, and with equal speeds in forward and reverse you save time on every job.

This 40-h. p. tractor also features a

torque converter and power steering. It is available with the famous Ferguson system for hydraulic draft control of rear-end implements.

The famous Massey-Ferguson Loader and Backhoe are power-fitted to the 204 for an integrated, incomparable power package. With the 220 Backhoe you can even dig flush alongside walls and fences with unhampered visibility. The Massey-Ferguson Loaders have a variety of attachments for added utility. A demonstration will prove what this rig **CAN DO** for your profit picture!

**Why Wait? — Set a Date — We'll Demonstrate!**



**MASSEY-FERGUSON INDUSTRIAL DIVISION**

Block 1000 South West St.,

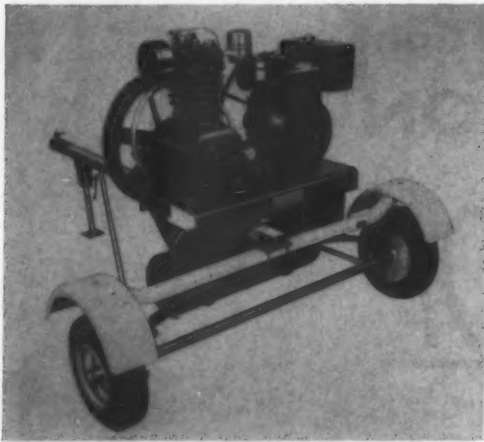
Wichita 13, Kansas

*Producing Sizeable Power for the "Sensational 60's"*

MF 60-11

APRIL, 1960





#### Trailer-borne compressor for maintenance painting

A trailer-borne compressor for airless spray painting and other maintenance jobs is available from the Devilbiss Co.

The 6-hp unit will deliver 15 cfm at 80 pounds pressure and 13.5 cfm at 125 pounds pressure. Mounted on a sturdy, lightweight boat-type trailer, the compressor is easy to haul and handle.

The unit is 82½ inches long, 66 inches wide, and 45½ inches high. It weighs 513 pounds.

For further information write to the Devilbiss Co., Dept. C&E, 300 Phillips Ave., Toledo 1, Ohio, or use the Request Card at page 18. Circle No. 63.

#### Pin, bushing press for crawler tracks

Lempco Products, Inc., announces the Model 651 crawler-track pin and bushing press.

Known as Powermatic, it features 150-ton capacity, plus adjustable double-tooling and balanced-load design. Fast disassembly and assembly of track are performed without shims and without tedious inching of ram. Broaching of track links is also eliminated.

The Model 651 press reportedly will service all domestic crawler-tractor tracks, with track grousers either on or off. Controls are fully hydraulic.

A hydraulic track indexer, 6,000-pound pull winch, conveyors, and stands are available. The new press is built in both stationary and portable models.

For further information write to Lempco Products, Inc., Dept. C&E, 5490 Dunham Road, Bedford, Ohio, or use the Request Card at page 18. Circle No. 9.



#### Vibrator moves materials through bins, hoppers

A new explosionproof electric vibrator for moving stubborn materials through bins, chutes, and hoppers is available from The Cleveland Vibrator Co.

Called Model RC-32, the unit is said to be practically noiseless, and maintenance requirements are minimal.

The RC-32 delivers 3,600 vibrations per minute with 60-cycle current. The user can adjust vibration impact from 385 to 1,100 pounds with seven separate settings.

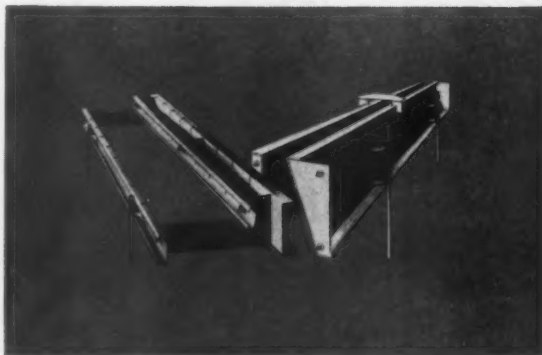
This vibrator is available in 3-phase ac current, either 220 or 440 volts, with an input of 500 watts. Weighing 51 pounds, the unit is 9



inches long, 8½ inches wide, and 10 inches high.

For further information write to The Cleveland Vibrator Co., Dept. C&E, 2850 Clinton Ave., Cleveland 11, Ohio, or use the Request Card at page 18. Circle No. 132.

## Job Engineered Construction Equipment By HELTZEL



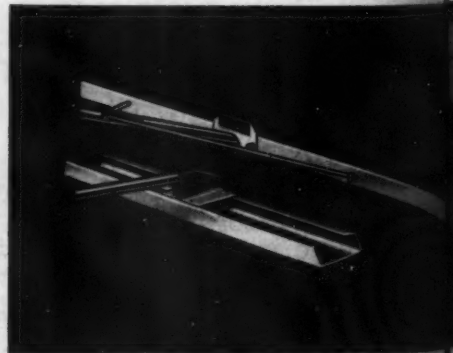
**CURB, CURB AND GUTTER AND ADJACENT CURB FORMS** Heltzel design provides versatility in these forms. Permits wider range of applications from a single basic set. Request Bulletin H-563-A.



**CLAMSHELL GATES**—Wide range of types to meet virtually any requirement. Pin-point control of material flow regardless of bin capacity—type of material—discharge rate or other job requirements. Request Bulletin H-568.



**SCALE EQUIPMENT**—Sensitive, accurate weighing designed as an integral part of the batching equipment—either manual or automatic can be furnished. Scales are rugged—trouble-free. Request Bulletin H-568.



**STRAIGHT EDGES AND FLOATS**—Straight edges equipped with reinforcing corner braces, reversible blade and double strength handle. Floats are steel construction with turned reinforcing flanges. Request Bulletin P-22.

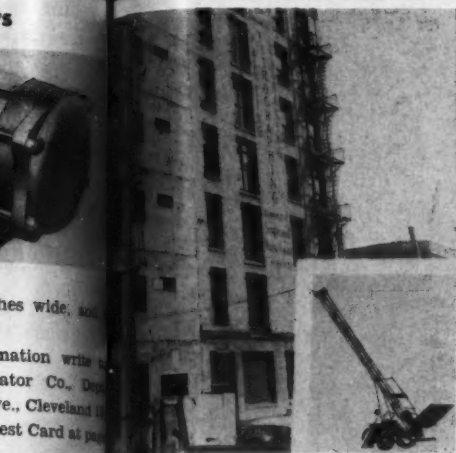
Half a century of designing and manufacturing products for the construction market has given Heltzel the inherent ability to provide contractors with equipment that meets today's construction requirements for speed and quality at least cost.

It will pay you to investigate the complete Heltzel line of products. Wide in scope, it ranges

from every type and size of concrete batching plant or materials storage units—to Flex-Plate highway finishers—to forms and handtools.

If you want the best in construction equipment engineered to today's contractor requirements, write us direct—or get in touch with your nearest Heltzel distributor.





Extra sections for the Tusky hoist are said to be lighter, yet stronger, permitting tower sections to be added quickly when the hoist is used for unloading heights up to 140 feet. The Tusky hoist is automatically controlled, including limit switch (override control), and reportedly may be erected and put to work within 5 minutes of its arrival on the job. Other features include hydraulic drive that eliminates clutch, automatic stopping at unload levels, automatic overload preventer, 1,500-pound payload capacity, and automatic concrete bucket. For further information write to the **Tubular Structures Corp. of America**, Dept. C&E, 2960 Marsh St., Los Angeles, Calif., or use the Request Card at page 18. Circle No. 148.



The Unit Model 357's carrier is matched to the crane upper works for maximum stability and to permit fast operation.

### Self-propelled crane lifts up to 15 tons

The Unit Crane & Shovel Corp. announces the newly improved Model 357, a self-propelled rubber-tire mobile crane capable of handling a 15-ton-capacity load. The new model converts easily and quickly into a  $\frac{3}{4}$ -yard clamshell or dragline.

Mounted on six pneumatic tires (duals in the rear), the Model 357 is designed to handle a wide range of operations regardless of location, on or off the highway. One engine powers all functions, and one man controls and operates the machine to, on, and from the job. Pendant-type boom rigging is standard equipment.

High-speed travel is accomplished through a 2-speed air-operated transmission. A short turning radius is another feature, and the machine's over-all dimensions are said to meet most highway requirements.

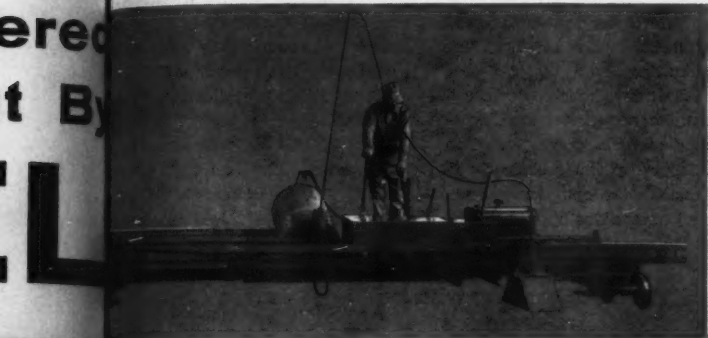
For further information write to the Unit Crane & Shovel Corp., Dept. C&E, 6411 W. Burnham St., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 99.

### Diesel-powered pumps in wide range of sizes

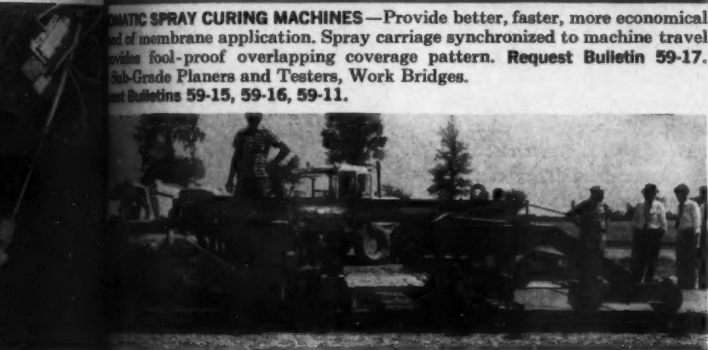
The Carver Pump Co. has introduced a new line of pumps equipped with Lister-Blackstone diesel engines.

Self-priming and non-self-priming models are available in capacities from 40 to 1,600 gpm.

For further information write to the Carver Pump Co., Dept. C&E, P. O. Box 311, Muscatine, Iowa, or use the Request Card at page 18. Circle No. 13.



**AUTOMATIC SPRAY CURING MACHINES**—Provide better, faster, more economical method of membrane application. Spray carriage synchronized to machine travel provides fool-proof overlapping coverage pattern. Request Bulletin 59-17. Sub-Grade Planers and Testers, Work Bridges. Request Bulletin 59-15, 59-16, 59-11.



**PLANE CONCRETE HIGHWAY FINISHING MACHINES**—Self-widening frame makes need for two or more finishers for paving different slab widths. Independent screed and traction drive motors provide separate and infinite speed adjustment. Request Bulletin 59-A.



**STORAGE BINS**—Your requirements for storage of any granular material can be matched exactly with a Heltzel Steel Storage Bin. Circular, square, rectangular types available. Request Bulletin O-35.



**CONCRETE BATCHING PLANT**—For Transit Mix, Paving or Prestress operations. Cement, aggregate or combination plants for 1-2-3 or 4-stop batching. Manual, semi or full automatic. Full range of material handling and accessory equipment. Request Bulletin H-561-155, 59-2, 60-28.



**CONCRETE BUCKETS**—Heltzel offers both standard or heavy duty concrete buckets all designed with steep hopper slopes, self-cleaning gates—accurate discharge control. Handle all types of materials—empty clean.

**WALK FORMS**—Rugged, easy to erect and strip. Made in 10 foot sections for easy handling—alotted 12 inches for division plates. Request Bulletin H-563-A.

Concrete batching plant to Flex-Plan and tools. tion equipment requirements with your near

## THE HELTZEL STEEL FORM AND IRON COMPANY

WARREN, OHIO

### OTHER HELTZEL PRODUCTS INCLUDE:

Highway and Airport Forms  
Unitized, Portable and Stationary Concrete  
Proportioning Plants  
Recirculating Cement Systems  
Storage and Loading Bins  
Bridge, Highway, Airport Finishing Machines

Sub-Grade Planing & Testing Machines  
Joint Installing Machines  
Mechanical Dowel Bar Installers  
Work Bridges  
Handtools  
Materials Handling Systems

For more facts, use Request Card at page 18 and circle No. 390





## Product Parade

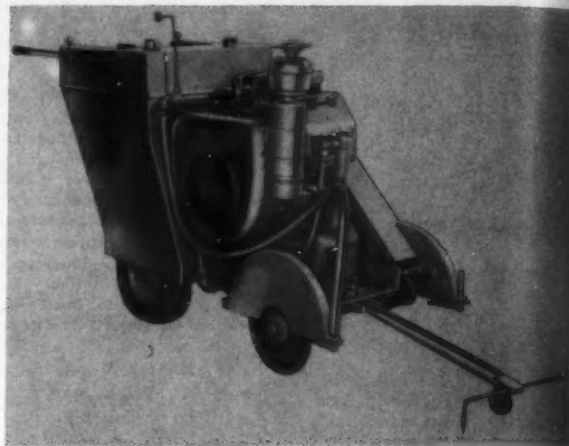
### Diazo copying machine designed for office use

The new Copyflex Model 120 diazo copying machine, designed principally for office use, has been introduced by the Charles Bruning Co., Inc.

The machine copies translucent and semitranslucent originals, and features automatic separation of copies from originals before delivery. It reportedly can produce hundreds of letter-size copies per hour and requires no stencils or masters, no transfer sheets, and no peeling of transfer sheets. In addition, sensitized materials are handled only once.



For further information write to the Charles Bruning Co., Inc., Dept. C&E, 1800 W. Central Road, Mount Prospect, Ill., or use the Request Card at page 18. Circle No. 20.



### Power-driven cutter for concrete, asphalt

Engineered Equipment's new Tri-Line concrete-cutter saw is designed with a lockable third wheel for straight cutting.

Other features of the cutter are a tricycle undercarriage for maneuverability and variable speeds from 0 to 40 fpm. Direct hydraulic blade-depth control enables the operator to start cutting without adjusting the blade, since it returns automatically to pre-

set depth. All controls are located on an easy-to-reach panel.

Power is supplied by 2 and 4-cylinder air-cooled gasoline engines.

A manually propelled model is also available.

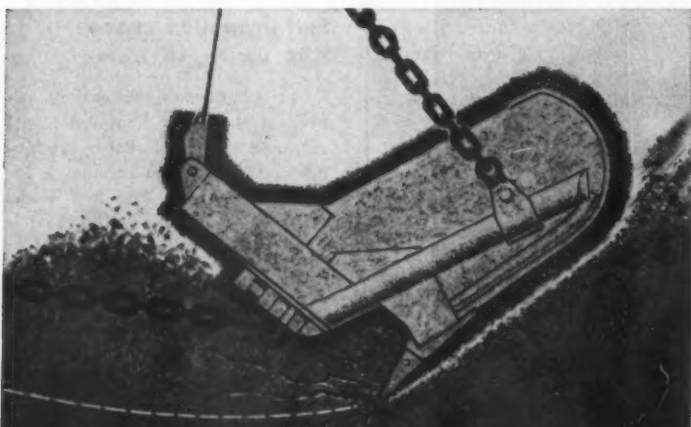
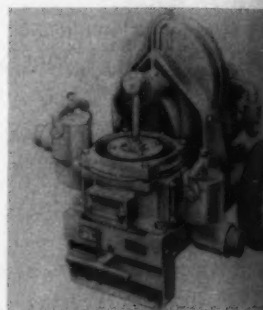
For further information write to Engineered Equipment, Inc., Dept. C&E, 1001 Linden Ave., Waterloo, Iowa, or use the Request Card at page 18. Circle No. 21.

### Heavy-duty sludge pump with ball-type valves

McGowan Pumps announces a heavy-duty, ball-valve diaphragm pump said to give trouble-free pumping of sludge.

Capacities range from 3,000 to 6,000 gph, and the pumps are available in 3 or 4-inch sizes with either electric-motor or engine drive. They can be base or wheel-mounted.

For further information write to McGowan Pumps, Division of Leyman Mfg. Corp., Dept. C&E, 3400 Central Parkway, Cincinnati 25, Ohio, or use the card at page 18. Circle No. 88.



# BUILT TO DIG!

Stopping arch; bucket will dig in and bite no matter how landed.

More adjustments at hitch position than any other bucket.

Inside of scoop extremely clean for fastest dumping.

Rounded lip contour for easiest penetration.

Weight concentrated low for accurate casting and proper digging.

All buckets may be perforated for handling wet materials.

Trunnion brackets located for quick dumping.

Provision for side cutters if needed.

Sharp points and cutting edges for quickest slicing action into material. Correctly sloped points to pull bucket deeply into earth.

## WILLIAMS



Durable clamshell and dragline buckets for every application

Williams Bucket Division, The Wellman Engineering Company, 113 St. Clair Ave. N.E., Cleveland 14, Ohio.

**SEND FOR  
FREE  
CATALOG**

**WILLIAMS BUCKET DIVISION**  
The Wellman Engineering Co.  
113 St. Clair Ave. N.E., Cleveland 14, Ohio  
Please send me the new Williams Bucket catalog.

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

A-1

For more facts, use coupon or Request Card at page 18 and circle No. 391

**NEW** to the pages of "CONTRACTORS and ENGINEERS"  
but, 8 years in one airfield . . . **PROOF** that

## MOBLEYTITE

### CONCRETE JOINT SEALER

Can take the present-day Jet blasts. (Mobleytite, after installation, will stand firm under 2000° F. heat.)

MOBLEYTITE is impervious to jet fuel, water and oils.

MOBLEYTITE is a SINGLE-COMPONENT sealant — i.e., delivered directly from shipping container to joint.

MOBLEYTITE is non-extruding! No time lost for "heating up" periods. Frost action has no ill effects on sealant.

MOBLEYTITE contains no asphalt, coal tar, rubber, epoxy, or polymers.

MOBLEYTITE sealer follows the parabolic curve-in line. No voids, if left slightly concave in the joint.

Write for brochure, technical data, prices and machinery (screw-type) available.

**GARBER-MOBLEY MANUFACTURING CO.**  
BOYERTOWN, PENNSYLVANIA

For more facts, use Request Card at page 18 and circle No. 392

CONTRACTORS and ENGINEERS





Designed and constructed for simplicity of operation, the new Dunham transit mixers are offered in both power-takeoff and engine-driven models.

### Transit-mixer capacities range up from 4 1/2 yards

A new line of heavy-duty transit mixers has been introduced by the Dunham Mfg. Co.

Named Porto-Mix, the mixers are offered in a variety of sizes ranging from 4 1/2-cubic-yard capacity. Both power-takeoff and engine-driven

models are available from the manufacturer.

For further information write to the Dunham Mfg. Co., Dept. C&E, P. O. Box 431, Minden, La., or use the Request Card that is bound in at page 18 of this issue. Circle No. 48.

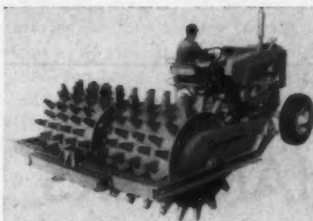
### Self-propelled roller works forward, reverse

The Shovel Supply Co. announces the Model SP-112-48 self-propelled compaction roller.

Equipped with a 70-hp diesel engine and 3-speed transmission, the roller operates equally well forward and in reverse. When it is ballasted, pressures up to 510 psi may be obtained.

Since it does not need to turn, the roller is especially suitable for widening work on highways, where it reduces hazard to passing traffic.

For further information write to the Shovel Supply Co., Dept. C&E,



In the compaction of narrow fills on overpasses the Model SP-112-48 roller is fast and powerful.

P. O. Box 1369, Dallas 21, Texas, or use the Request Card at page 18. Circle No. 112.

### Torque-wrench calibrator reads break-away value

Designed to rapidly load and read out the actual break-away value of torque wrenches of any design, the Model TWC-139 torque-wrench calibrator offered by Steel City Testing Machines, Inc., uses a conventional proving ring as a load-measuring standard.

For most torque-wrench designs, operation is automatic. The digital counter translates the linear displacement of the proving ring into torque values with a reported calibration

accuracy of 0.4 per cent of full scale. It can calibrate torque wrenches with capacities from 20 inch-pounds to 2,000 foot-pounds.

The four ranges of this instrument are: 20 to 1,000 and 1,000 to 5,000 inch-pounds, and 1 to 500 and 500 to 2,000 foot-pounds.

For further information write to Steel City Testing Machines, Inc., Dept. C&E, 8817 Lyndon Ave., Detroit 38, Mich., or use the Request Card at page 18. Circle No. 113.

## Bill Smith, contractor, speaks on used equipment!



"Take it from me, I've bought some real junk in used machines. Fixing 'em up and keeping them fixed used to be just one long headache.



"But now things are a lot different. When I buy used equipment, I buy from a Caterpillar Dealer.



"I've found Caterpillar used machines similar to new in more ways than one. They stand up better and are easier to keep working. And here's something else that's important...



"By keeping them in good shape, when I trade them back in, I get top dollar. I guess you could call that 'built-in' value!"



Your Caterpillar Dealer can give you the best used equipment buys in town. No other outfit offers you deals with this protection:

A "Bonded Buy" up to \$10,000 on used Caterpillar equipment—your guaranteed assurance of satisfactory machine performance and on all parts of the machine during the guarantee period... and it includes labor, too. Also a "Certified Buy" and a "Buy and Try" class of machines that give you full value for the money.

You know what you're buying from a Caterpillar Dealer. He's listed in the Yellow Pages. Make his lot your first stop for used equipment.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

# CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

**BEST BUYS IN NEW AND USED EQUIPMENT**

For more facts, use Request Card at page 18 and circle No. 394



**POWER TROWELS** 6 models; 2 Hydro-Trowels, 4 manually-adjusted... for velvet smooth floor finishes.

**COMPACTOR FLOATS** 3 Compaction Control models... improve wear resistance and reduce installation costs of floors.

**POWER TAMPERS** 3 self-propelled models, 2700 impacts/min., to pack down earth backfill and finish blocktop.

**POWER BUGGIES** 10 Cu. Ft. capacity with hydraulic dump and dual-traction differential.

**SPACE HEATERS** 5 models; 75,000 to 400,000 B.T.U./Hr.—HEAT-ON-WHEELS.

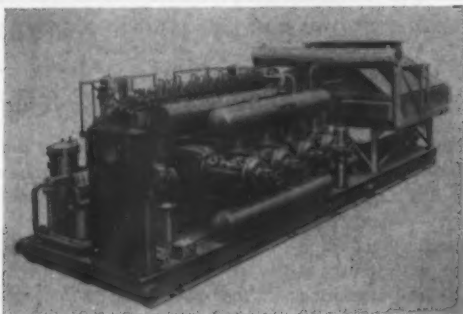
**KELLEY MACHINE DIVISION**  
285 Chicago Street Buffalo 4, New York

Please send me information on Kelley:

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_

For more facts, use coupon or Request Card at page 18 and circle No. 393





### Automatic control panels for field compressors

A new series of automatic control panels has been introduced by the Clark Bros. Co. to simplify the opera-

tion of HMB-TMB packaged field compressors.

Consisting of a complete pneumatic starting and stopping system, which operates on 75-psi air or gas pressure, the control is furnished as an integral part of the compressor package. Each panel is engineered to match the operating features of the compressor.

These control panels can also be installed on Clark compressors already operating in the field.

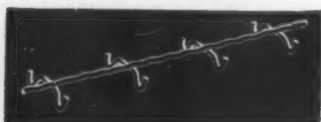
If desired, yard valves and compressor cylinder unloaders can be tied into the panel for manual or automatic operation, and the panel itself can be tied into a remote starting system.

TIME  
SAVED  
TWICE!  
with

**SYLGAB**

### Continuous BAR BOLSTER SUPPORTS

1. The right material at the right time. No delays due to late delivery or mixed-up shipment.
2. Designed for speedy, easy installations. Allows fast pouring due to high rigidity.



### A RUGGED SUPPORT FOR SLAB REINFORCEMENT

Made in 5' lengths of hard steel wire supporting bar with wire legs spaced either standard 5" distance or directly under each slab rod (4" min.)

Member Concrete  
Reinforcing Steel Institute

Manufacturers of Steel  
and Wire Accessories  
for Concrete and Fire-  
proof Construction.

**SYLGAB**  
**STEEL & WIRE CORP.**  
79-05 Cooper Ave., B'klyn 27, N. Y.

BEAM CLIPS • SPECIAL COLUMN CLIPS  
EXPANSIBLE CLIPS  
STRAIGHT AND COIL WIRE  
HAIRPIN CLIPS • TOGGLE HANGERS  
FORM SPACERS • BAR ACCESSORIES

Request Catalog—Phone or Wire Collect

For more facts, circle No. 395

The control panels can be stationary-mounted or rubber shock-mounted on the compressor skid, to meet specific requirements.

For further information write to the Clark Bros. Co., a division of Dresser Industries, Inc., Dept. C&E, 621 17th St., Olean, N. Y., or use the Request Card at page 18. Circle No. 54.

### New hydraulic ripper digs to 48-inch depth

The Brute, a hydraulic ripper for the International Harvester TD-25, is available from The Greenville Steel Car Co.

The new ripper has adjustable shanks for various ripping depths up to 48 inches. Adjustments are made quickly and easily by changing the position of movable pins in the swing brackets. Shanks swivel 15 degrees in either direction to allow points to "float" beneath the ground, seeking out cracks and weak points in rock.

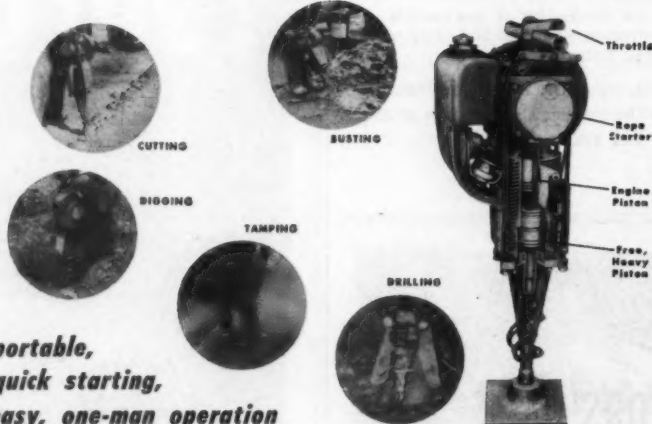
Straight shanks in 24, 42, and 48-inch digging lengths are offered, and curved shanks in 24-inch lengths. A new push-block can be attached, straddling the center shank and swing beam for booster ripping.



When the new Greenville hydraulic ripper for International Harvester TD-25 tractors is retracted, the rear end of the tractor remains clear for other uses.

For further information write The Greenville Steel Car Co., Earthmoving Equipment Division, Dept. C&E, Greenville, Pa., or use the Request Card at page 18. Circle No. 55.

## SYNTRON 100% Self-contained GASOLINE HAMMERS



portable,  
quick starting,  
easy, one-man operation

SYNTRON 100% Self-contained Gasoline Hammers are the most effective tool of this type available.

They are fast, efficient hammers that develop 2000 powerful blows per minute — require no auxiliary equipment.

Compact design (no compressor, hose, cable, battery box, etc.) offers easy portability to the job and one man operation on the job.

Dependable, they start quickly, summer or winter in temperatures from 110° F to 65° F.

Versatile, their use varies with job requirement — busting concrete, digging clay, driving rods and railroad spikes, tamping back fill and many other jobs.

Also available, SYNTRON 100% Self-contained Rock Drills that drill at the rate of two feet per minute with automatic bit rotation.

Write for complete catalog data

### SYNTRON COMPANY

227 Lexington Ave.

Homer City, Penna.

Other SYNTRON Equipment of proven dependable Quality



VIBRATORY FEEDERS



ELECTRIC HAMMER DRILLS



VIBRATING SCREENS

For more facts, use Request Card at page 18 and circle No. 396

### YOU CAN'T OUTGROW A ROLCOR ROLLER STATIC OR VIBRATORY



Whether your job is ...

Crease rolling ... Driveways ... Parking lots ... Patching ... Tennis courts ... rolling ... Maintenance ... you won't outgrow the usefulness of a Rolpac.

That's why thousands of contractors, landscapers, institutions and others make Rolpac their "number one" unit. One week on your job will prove to you why Rolpac is the top selling one-ton roller in the United States.



Here's a two-ton vibratory roller that produces compaction to equal or exceed static rollers weighing 40 tons! Vibrapac is 100% American designed and built specifically for asphalt and soil compaction — corrugation of surfaces. A single clutch shifts from static to vibratory action. Works in close places.

Easy to transport with Rolcor Trailer.

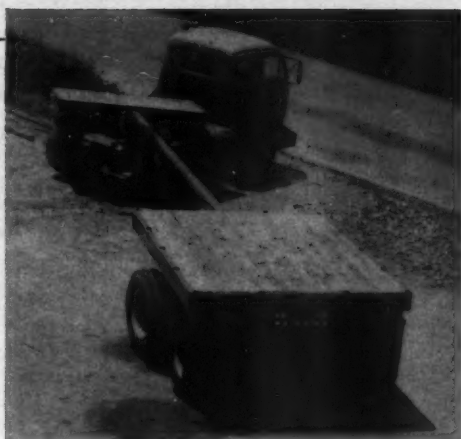
WRITE FOR FULL  
INFORMATION AND  
LITERATURE

**ROSCO MANUFACTURING CO.**  
**ROLCOR DIVISION**  
3118 Snelling Ave. • Minneapolis 6, Minn.

For more facts, circle No. 397

CONTRACTORS AND ENGINEERS





### New tandem-axle unit is steered automatically

The Pollock Steeromatic tandem-axle unit is a self-contained mechanically operated steering assembly. The unit is steered automatically and does not require any manual operation by the driver. A simple air-operated device, controlled from the truck cab, locks the unit if required.

The unit is basically composed of a ball ring mount, frame, two leaf springs embedded in rubber cushions, a steering tongue, axles, and wheels. Measurements are equivalent to a

standard rigid unit in width, height, and wheelbase.

Offered in several sizes, with load capacities from 20 to 40 tons, the Steeromatic unit is of sturdy light-weight alloy-steel construction, with a minimum number of operating parts.

For further information write to Pollock Industries Inc., Dept. C&E, S. Keim St., Pottstown, Pa., or use the Request Card at page 18. Circle No. 76.

For further information on any product described in this section circle the indicated number on the Request Card at page 18.

### Conveyor belt designed for steep inclines

Dur-A-Lift, a new incline conveyor belt, is offered by the Boston Woven Hose & Rubber Co., a division of the American Bilrite Rubber Co.

The belt is especially designed for carrying objects up an incline as steep as 45 degrees.

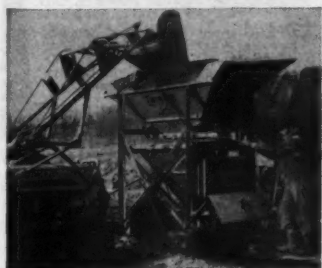
The top cover consists of parallel, transverse inverted-V ridges of wear-resistant Dulon, said to make the belt more resistant to abrasion, gouging, tearing, and oxidation. The deep V-ridges are self-cleaning and assure maximum grip action at all times.

For further information write to the Boston Woven Hose & Rubber Co., a division of the American Bilrite Rubber Co., Inc., Dept. C&E, Box 1071, Boston 3, Mass., or use the Request Card at page 18. Circle No. 10.

### FROM FLORIDA TO BAFFINLAND



CIMCO TWIN BIN and BUCKET team cut concrete costs \$9.75 per cubic yard.



**BUY CIMCO BUY**  
LOW-PRICED  
**BATCHERS-BUCKETS**  
For complete information, specifications and prices on all CIMCO products, write: CIMCO, Box 422, Marshalltown, Iowa

For more facts, circle No. 399

## DELMAG

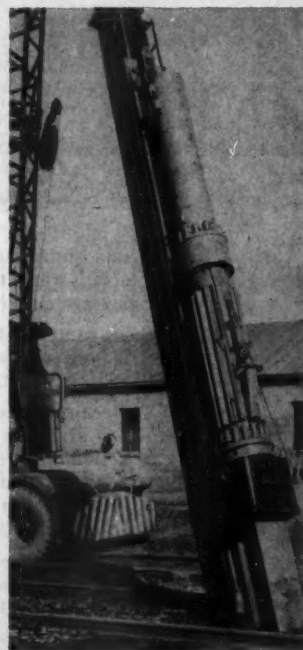
### DIESEL PILE HAMMERS

# for top performance

## LOWER OPERATING COSTS

Engineered for top performance, Delmag Diesel hammers provide many exclusive, advanced features that contribute to their tremendous popularity. Weighing less than comparative hammers, they give you more ft.-lbs. for each pound of weight than any other hammer on the market today. Compact simplicity plus all-weather adaptability make for better economy.

See how Delmag, oldest and most experienced makers of Diesel hammers helps you to cut your operating costs.



#### Three Models Available:

- D-5  
9100 Ft. Lbs.
- D-12  
22500 Ft. Lbs.
- D-22  
39700 Ft. Lbs.



Illustrated literature sent on request.

The Foundation Equipment Corp., 100 Elizabeth St., Newcomerstown, Ohio.	Martz Machinery Co., 988 Market St., San Francisco 2, Calif.
Andrews Machinery of Washington Inc., 3633 East Marginal Way, Seattle 4, Wash.	Special Construction Machines, Ltd., 166 Bentworth Ave., Toronto 19, Ont.

For more facts, use Request Card at page 18 and circle No. 400

## TIME CLOCK

### Your equipment can punch!



Automatically records

## every minute of BUSY TIME IDLE TIME

Can save you thousands of dollars!

It's tamperproof! It automatically keeps a work record of any piece of equipment that moves. It lets you put your finger on costly delays or overtime. It records every start, stop — can even record engine idling time. Here's the business-like way to know what service you are getting from every piece of equipment.



This "Time Clock" is called

## SERVIS RECORDER

It makes a clear record on permanent charts. Motion activates the recorder — no mechanical hook-up is involved. Write today!

## SERVICE RECORDER CO.

3123 ROCKWELL AVE., CLEVELAND 14, OHIO

For more facts, circle No. 398

No. 397

D ENGIN, 1960





An improved epoxy resin helped solve the problem of designing a better plate to cover the expansion joints on San Francisco's Golden Gate Bridge, and to replace the bearings upon which these plates rested. The use of Devcon Plastic Steel reportedly aided in maintaining a plus or minus 1/1,000-inch tolerance for this installation. For further information write to the Devcon Corp., Dept. C&E, Danvers, Mass., or use the Request Card at page 18. Circle No. 14.



Scarifying heavy clay subgrade after application of 5% hydrated lime. Note large clay clods.

## IN-PLACE LIME STABILIZATION SAVES EXCAVATION

Before lime stabilization, unstable clay subgrade soils often were excavated and replaced with better borrow materials—a costly procedure.

Now, these same unstable clays, having P.I.'s as high as 50, are utilized fully with hydrated lime (3-6%)—at a substantial savings.

**WHY?** Because lime reduces plasticity and swell, increases strength and stability through a cementing action, and renders the soil relatively impervious to water. Due to these striking improvements, reductions in pavement thickness are justified.

And lime stabilization is permanent, as evidenced by 14 years of successful durability experience. Used in highest types of pavement, including interstate highways and jet bomber bases.

## ONLY LIME HAS PROVEN ITSELF WITH HEAVY CLAY SOILS



Write for free booklet,  
"LIME STABILIZATION  
CONSTRUCTION MANUAL"



**NATIONAL LIME ASSOCIATION**

925 15th STREET, N.W., WASHINGTON 5, D. C.

For more facts, use Request Card at page 18 and circle No. 401

## New file size available for large rolls of plans

The Plan Hold Corp. announces new, larger stack roll file (diameter of 4 1/4 inches ID).

Designated Model LRP, the new file has a steel housing for four tubes and is available in seven sizes from 2 to 5 feet in length. It retains the same 12 1/2-inch width as the basic unit but is 12 inches high. It can be stacked with basic stack file units to form a single rigid file.

For further information write to the Plan Hold Corp., Dept. Chakemco St., South Gate, Calif. Use the Request Card at page 18. Circle No. 5.

## Cable control units for big crawler

Two new planetary-drive cable control units—the front-mounted Model 160 and the rear-mounted Model 260—now are available for the International TD-25 crawler.

Both units are designed to handle the new heavier equipment developed as matching units for the TD-25.

The single-drum Model 160, with a brake capacity of 9,000 pounds line pull at bare drum speed, is a heavy-duty, fast-acting control.

The double-drum Model 260 uses a ring gear and pinion to drive a 4-gear planetary system for each cable drum.

High-strength lightweight nodular iron major castings, with a unit weight of 2,260 pounds, are used for the Model 260. The cable drums can handle 248 feet of up to 3/8-inch cable, attaining a full drum speed up to 650 fpm and a bare drum speed up to 412 fpm.

For further information write to the International Harvester Co., Dept. C&E, 180 N. Michigan Ave., Chicago Ill., or use the Request Card at page 18. Circle No. 30.

To Keep Power Equipment Running  
To Stand Guard on the Job

**THE ANSWER IS**

**Anthes**

**The WEATHERCAP®**



Rain cannot get in a vertical exhaust protected by Weathercap. Range of sizes to fit 1" to 6 1/2" O.D. Fully automatic.

OPENS at the first touch of exhaust pressure, CLOSES the instant the engine stops. . . . Now standard equipment on over 35 nationally known names in tractors and powered equipment.

**The FLAME-GUARD**

**Construction Torch**

New self-righting torch with an exclusive square-type burner which STAYS LIT in the worst weather. . . . Burning time of 24 to 48 hours. . . . Quality Anthes construction throughout.



Get the full answers and literature from

**Anthes**

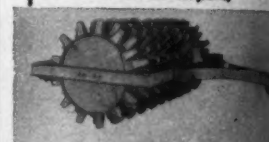
GLEASON CORPORATION  
FORT MADISON, IOWA

For more facts, circle No. 402

**Grace**  
ASPHALT  
AND COMPACTION  
EQUIPMENT



Roadsweeper,



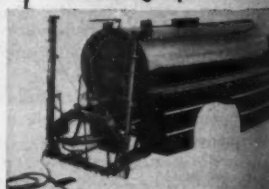
Sheepfoot rollers



Chip spreaders



Circulating asphalt heaters



Asphalt Distributors



Pneumatic rollers, self-propelled or trailed

**W. E. GRACE MFG. CO.**

For more facts, circle No. 403

CONTRACTORS AND ENGINEERS



available  
of plans

Corp. announced  
roll file features  
inches ID.  
L.R.P., the  
g for four  
able in seven  
length. It  
h width  
2 inches  
a basic  
single rigid  
information  
Dept. C&E,  
h Gate, Calif.  
ard at page



Designed for highway patching and similar light-duty operations, the Holt roller is powered by a 12½-hp engine.

### New roller is announced in 3-ton weight class

The Model 3-ADH fully automatic-driven and controlled roller in the 3-ton weight class is announced by Holt.

The completely hydraulic center-point steering gives no overlapping as each roller follows directly behind the other, even on short turns. Also, an auxiliary edge roller is available for work close to curbs and walls.

Power is supplied by an electrically started 12½-hp engine.

All Holt rollers are portable, and trailers to fit each model are available.

For further information write Holt, Dept. C&E, Independence 4, Ore., or use the Request Card at page 18. Circle No. 15.

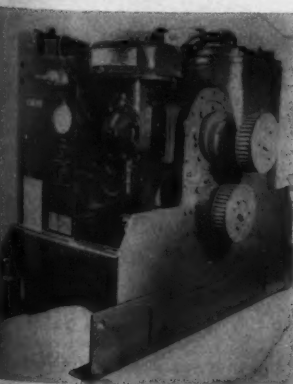
### Rotary PTO compressor is lighter, more compact

The Worthington Corp.'s 125-cfm rotary power-takeoff compressor is now available in a more compact version.

The new unit is 31½ inches high, 30¼ inches wide, 28 inches long, and weighs 850 pounds. It consists of a 2-stage oil-cooled rotary compressor, speed control, minimum pressure valve, engine governor, oil cooler, and combination air-oil reservoir. The component parts are integrally mounted on a welded steel frame.

This compressor can be mounted on Jeeps, trucks, and tractors, and is completely controlled from the cab by the driver.

For further information write to the Worthington Corp., Dept. C&E, 37 Appleton St., Holyoke, Mass., or use the Request Card at page 18. Circle No. 66.



### AT THE TOUCH OF A BUTTON

the Electrol GenerAC will supply shop-type electrical power from your truck, car or tractor — anytime, anyplace.

This high-output, 115/230-volt, 60-cycle alternator is available in a size for your every requirement.

Mounting is simple, with kits available for all popular makes of vehicles.

Write to

**GenerAC Sales Inc.**

124 S. Main Street  
Wales, Wisconsin

For more facts, use Request Card at page 18 and circle No. 404



The ML-157 (shown above) has a 7000-lb. carrying capacity. Lorain also builds the ML-153 with 6000-lb. carrying capacity.

## MOTO-LOADER®. BALANCED\* THREE WAYS FOR FAST CYCLES... BIG OUTPUT

1. **\*WEIGHT BALANCE.** Lorain puts the center of gravity low, distributes the weight on heavy-duty axles for ground hugging travel without bounce or teeter. The product of true engineered balance, the ML-157 travels with its load at optimum height to save dump time at the truck.
2. **\*CONTROL BALANCE** features one-foot travel and speed control for coordinated work flow. Using "no-hands" direction selectors, operator keeps one hand on the wheel at all times, uses other hand for other operations. Finger-tip controls require few motions for easy operation.
3. **\*POWER BALANCE.** Engine size, hydraulic capacity and multi-speed, power-shifted transmission provide the right degree of power for positive crowding and digging, smooth travel, fast loading. No wasted horsepower, no wheel spinning. All the power is used for work.

**PLUS ALL THE FEATURES NEEDED FOR BIG PRODUCTION** • Power booster steering • Torque converter • "Safety" lift arms • Heavier, one-piece frame • Four-wheel drive • Four-wheel hydraulic brakes • Shock absorbing, planetary wheel hubs • See your Lorain distributor.

**THE THEW SHOVEL COMPANY, LORAIN, OHIO**

# LORAIN®. ON THE MOVE

**PLANTS:** In Lorain, Elyria and Bucyrus, Ohio... **PRODUCTS:** Power shovels, cranes, draglines, clamshells, and hoes on crawlers from ¾- to 2½-yard capacity • Cranes from 7 to 80 tons... on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity... **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.



One-foot travel control boosts payloads... frees operator's hands for steering, bucket control and other operations. By pivoting his foot between two adjacent pedals, operator controls direction—forward and reverse. Speed is controlled by depressing pedal further.



### Pneumatic-tire rollers have improved design

The Tampo Mfg Co., announces two improved models of self-propelled pneumatic-tire rollers, the 10-ton SP91 and the 12-ton SP-111.

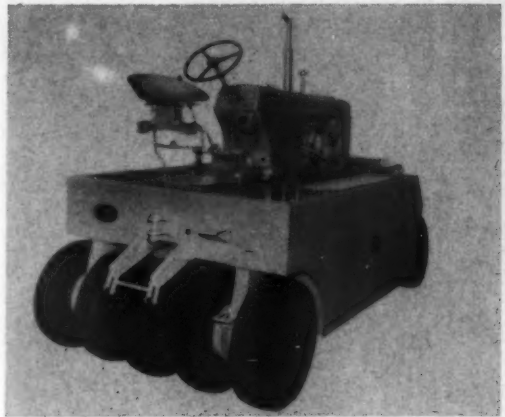
Both models feature an increase in maximum recommended load capacity and the addition of hydraulic wheel brakes. Torque-converter drive and automatic power-shift reverse operation, with 6 speeds forward and reverse, are standard equipment on both rollers.

Recommended loads are 20,000 pounds for the 9-wheel and 24,000

pounds for the 11-wheel machines.

Other features include sealed final-drive chains operating in a constant oil bath; constant-mesh, helical-gear transmission; and interchangeable wheels. The four-wheels-in-front design aids visibility and allows accurate steering along a curb or form line.

For further information write to the Tampo Mfg. Co., Inc., Dept. C&E., P. O. Box 4248, Station A, San Antonio 7, Texas, or use the Request Card at page 18. Circle No. 71.



Hydraulic brakes on all driving wheels and increased load capacity are features of the improved Tampo rollers.

Where SPECIFICATIONS call for . . . .

**HIGH DEGREE  
SOIL  
COMPACTION**



### BARCO RAMMERS are THE ANSWER!

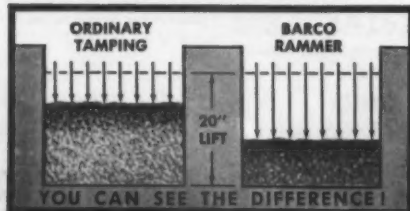
**YOU** can't get high degree SOIL COMPACTION by "patting it" or "shaking it." For deep, penetrating force to produce 95%, 97.5%, or even 100% compaction, Barco Rammers are THE ANSWER. For many soil conditions, they are the only answer.

High degree soil compaction is worth every cent it costs. Barco Rammers are especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches.

**ONE MAN OPERATION**—On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On 18" trench backfill, using lifts up to 24", the rate is 360 to 600 feet per hour.

**ASK FOR A DEMONSTRATION**—We will be glad to arrange a demonstration for you; see our nearest distributor or write.

SEND FOR A COPY OF CATALOG 621.



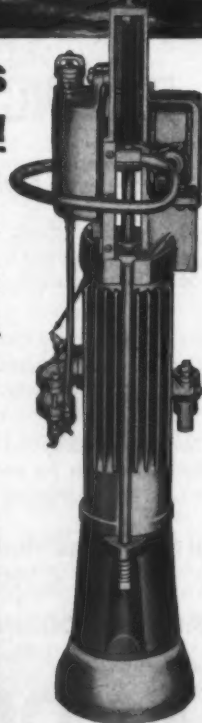
Sold and Serviced by the Nation's Leading Distributors

**BARCO MANUFACTURING CO.**  
518E Hough Street • Barrington, Illinois



**BARCO RAMMER** for High Degree Soil Compaction  
**BARCO-VIBRA TAMP** for Granular Fill and Bituminous Surfacing

For more facts, use Request Card at page 18 and circle No. 406



To obtain further information on any of the products described in this section, circle the number given at the end of the item on the handy Request Card at page 18.

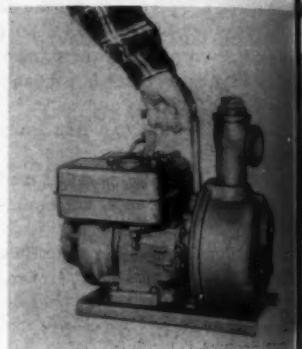
### New lightweight pumps offered in four sizes

A new line of lightweight centrifugal pumps called Wonder-Lites has been announced by the Construction Machinery Co.

The pumps feature an impeller and volute of abrasion-resistant cast iron for long life, and a pump body and engine of durable, lightweight aluminum for maximum portability. Another feature, states the manufacturer, is simplified construction, which means fewer moving parts, more reliable performance, and ease of maintenance.

The 3-inch size reportedly will pump better than 19,000 gallons of water per hour. All CMC Wonder-Lites will prime automatically on suction lifts up to 25 feet—with the 2-inch Model W12A priming at this lift in less than one minute.

These pumps are available in four models, in sizes 1½ to 3 inches, and



are powered by a Briggs & Stratton 4-cycle all-aluminum engine.

For further information write to the Construction Machinery Co., Dept. C&E, 447 Vinton St., Waterloo, Iowa, or use the Request Card at page 18. Circle No. 39.



**... Gets the Job Done !**

Whether it be on a major airbase, turnpike or city street, a Jersey Spreader gives low-cost, dependable performance . . . Big job or small, you always get your profit with a Jersey Spreader on the payroll. Fast and accurate, there's never a delay to hauling units. Models available to meet all requirements.



Write now for complete information and illustrated literature.  
**TRACTOR SPREADER COMPANY**

MANUFACTURERS OF THE JERSEY SPREADER  
HARBROUCK HEIGHTS, NEW JERSEY 38-34

For more facts, use Request Card at page 18 and circle No. 407

CONTRACTORS AND ENGINEERS



### Engine generator series

The 705 Series of Winco engine generators is announced by the Wincharger Corp.

Designed for portable or standby use, these new 7,500-watt units feature an idling control said to permit significant fuel savings, extend engine life, and reduce maintenance.

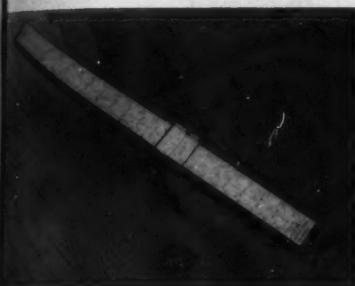
To make these new engine generators more portable, the firm is introducing a new universal Mobil-Power trailer.

For further information write to the Wincharger Corp., Dept. C&E, Insurance Bldg., Sioux City 2, Iowa, or use the Request Card at page 18. Circle No. 79.

Seventy-six thousand cubic yards of Type A concrete for construction of a 3,150-foot-long underwater highway tube and structures connecting Oakland and Alameda, Calif., is produced in a unique setup of a high-capacity transit-mix batching plant and two transfer plants. In accordance with state specifications, which limit transit-mix hauls to 1 mile, re-screened aggregates and sand are batched and hauled to two transfer plants at the Oakland and Alameda portals for subsequent charging of cement. Each transfer plant consists of a Noble aggregate-charging conveyor and a Noble cement batcher with 1,000-cubic-foot silo. For further information write to the Noble Co., Dept. C&E, P. O. Box 1979, Oakland, Calif., or use the Request Card at page 18. Circle No. 127.

For more data on any item, circle indicated number on card at page 18.

### Calculating instrument is labor-saving device



Resembling an ordinary slide rule, the Avol rule is designed to aid in calculating the cubic volume of cuts and fills in highway construction.

An engineering instrument said to greatly simplify the task of calculating the cubic volume of cuts and fills in highway construction is available from the Avol Mfg. Co. To measure area with the Avol rule, which resembles an ordinary slide rule, the slide is moved to the bottom of the rule, with the indicator line and pointer on zero. Then

each vertical line is measured by moving the pointer, and the accumulated lengths of all the lines are indicated on the rule without the necessity of any arithmetical paper work.

For further information write to the Avol Mfg. Co., Dept. C&E, Portland, Ore., or use the Request Card at page 18. Circle No. 36.

## Make more money by handling more trenching jobs...Faster... with an ARPS TRENCH HOG!



- ★ **Economy** . . . priced well below independent-drive machines. Operation and maintenance costs are rock-bottom low.
- ★ **Speed** . . . up to 800' hourly dependent upon soil conditions.
- ★ **Big Capacity** . . . depth capacities of 3½', 5½', and 7'; trench widths of 6" to 20".
- ★ **Choice of Cutters** . . . slicer for normal, wet, or sticky soils; chisel for hard, rocky soils; super-service for frozen ground.
- ★ **Accurate** . . . Precise depth control obtained by power pump boom control valve.
- ★ **Independent Wheel Control** . . . for each tractor drive wheel insures straight line digging or curve trenching.
- ★ **Optional Features** . . . include standard and tilting crumbers, one-side dirt delivery. Front-mounted Dual-Action Doser available for fast backfilling.

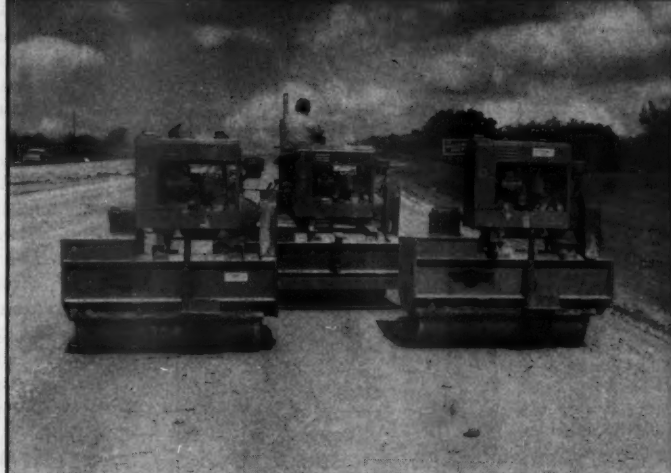
Write today for literature and prices. Dept. C&E

**ARPS CORPORATION**  
New Holstein, Wis.

TRENCHERS • HALF TRACKS • BULLDOZERS • UTILITY BLADES

For more facts, use Request Card at page 18 and circle No. 408

## ESSICK VIBRATING COMPACTORS



### COSTS DOWN—COMPACTION UP! WITH ESSICK 54" VIBRATING COMPACTOR

CONTRACTOR REPLACES EQUIPMENT WORTH \$67,200 AND DOUBLES PRODUCTION RATE—WITH HIGHER DENSITIES—FEWER PASSES—HIGHER LIFTS

On Texas State Highway 180, Fred Hall & Sons Contractor, were using two Model M tractors, three 10 ton pneumatics, one 3 wheel 10 ton roller, one 50 ton self propelled pneumatic, and one blade to compact crushed limestone with four different clay contents varying from 10% to 15%. They were having considerable trouble getting densities with 2" lifts and many passes of the 10 ton pneumatics, the 50 ton pneumatic on the third lift of 6", and a slushing and final rolling with the three wheel roller to slick off.

Three Essick VR-54 (54") Vibrating Compactors in triplex hook-up made two passes on the full six inch lift, with one more fast pass after a water slush to slick off. They got the required density of 140 pounds to the cubic foot, and increased material laid to twice the amount laid before. The three 54" Vibrating Compactors in triplex replaced \$67,200 worth of other equipment—reduced operating costs—and doubled the rate of production.

#### ESSICK VIBRATING COMPACTORS

In any compaction requirement, ESSICK High-Frequency Vibrating Compactors will cut costs, increase production with higher lifts, fewer passes, higher densities, at a greater profit. ESSICK Vibrating Compactors are constantly increasing the profit of thousands of contractors like Fred Hall & Sons and can do the same for you.



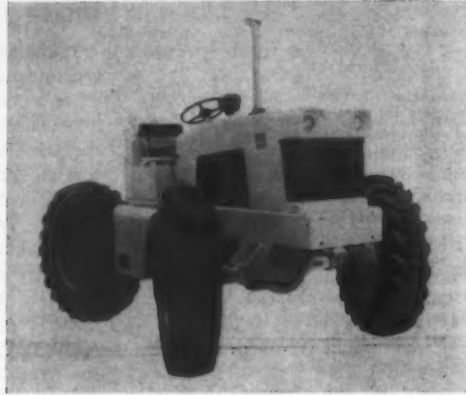
Also 14 Models of Tandem Rollers from ½ to 14 Tons.  
**SEE YOUR ESSICK DEALER FOR A DEMONSTRATION ON YOUR JOB**  
**ESSICK MANUFACTURING COMPANY**  
1950 Santa Fe Avenue  
Los Angeles 21, California  
850 Woodruff Lane  
Elizabeth, New Jersey

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

For more facts, use Request Card at page 18 and circle No. 409



Napco's new Crab tractor is designed to provide greater power and drawbar pull.



#### Four-wheel-steer tractor features 72-hp engine

A new 4-wheel-drive, 4-wheel-steer Crab tractor is announced by Napco Industries, Inc.

The unit features a Fiberglass hood and grille, with built-in headlights, said to offer greater rigidity than steel.

The machine also features a 6-cylinder gasoline engine offering 72 horsepower. Four-wheel hydraulic power brakes, torque converter, power steering, hydraulic reversing clutch, and heavy-duty axles are all available

as standard equipment.

Other improvements of the model are: increased capacity fuel tank, radiator and hydraulic supply tank; power brakes; doubled capacity for the torque converter heat exchanger.

For further information write the Construction Equipment Division, Napco Industries, Inc., Dept. C-834 N. Seventh St., Minneapolis, Minn., or use the Request Card on page 18. Circle No. 135.

#### SAFE • SPEEDY • DEPENDABLE

**Derricks** For every contractor's need—Stiff-Leg, Guy Line, Setter, A-Frame, Pole and Tripod, Roofers' Circle Swing Derricks... hand and/or power operated. Proved performers on every type of job. Safe and dependable.



**Sasgen**

#### Hoists

Made to fit your requirements—large or small. Complete units, like the Liftomatic, which reaches up to 90 ft., carries 1200 lb. load with electric or gasoline power—or Contractors' Drum Hoist Units, single or double drum, with capacities from 500 to 5500 lb. single line pull. Optional power.



#### Winches

From U.L. approved safety scaffold winches to heavy-duty hand-powered winches that will take from 400 to 40,000 lb. loads, Sasgen has a complete line to handle your job quickly and safely. You can't buy a better winch!



Handled by Leading Equipment Distributors Everywhere  
WRITE FOR CATALOG AND PRICES  
**Sasgen DERRICK COMPANY**  
3127 W. GRAND AVE. • CHICAGO 22, ILLINOIS  
For more facts, circle No. 410

#### Harbormaster Marine Tractors

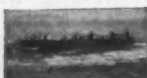


Harbormaster Marine Tractors are heavy duty outboard propulsion and steering units. They are a complete package, quickly and easily installed for immediate use on new or existing craft. Efficient and economical to operate and maintain, they give you many advantages over inboard marine power. Wherever you operate... shallow or deep water, along the coast, in harbors, lakes, canals or rivers... Harbormaster is ideal.

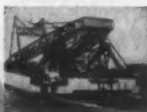
The advantages of Harbormasters... shorter trip times and exceptional maneuverability and versatility... have been proved in hundreds of installations. Models range from 40 to 500 hp, gas or Diesel. Available with direct or remote controls.

**MURRAY & TREGURTHA, INC.**  
44 Hancock Street • Quincy 71, Massachusetts

For more facts, circle No. 411



Steer in any direction with full power



Rugged, powerful, easily installed



Shallow water protection



Economical operation and maintenance

Send for catalog and get complete details.

#### New hardfacing electrode is 14 per cent manganese

A new hardfacing electrode, nickel manganese "C", is offered by the Air Reduction Sales Co.

The composite 14 per cent manganese electrode is said to be especially suitable for smooth build-up of dipper teeth, bucket lips, and crusher hammers, jaws, and screens.

The hardness as deposited ranges from 170 to 230 Brinell, and it will work-harden to 550 Brinell. The electrode can be used with either an ac or dc reverse polarity power source. Effective in all-position work, it is available in standard 14-inch lengths, in diameters of 1/8, 5/32, 3/16, and 1/4 inch. Slag coverage is complete and spatter low, states the manufacturer.

For further information write to the Air Reduction Sales Co., a division of the Air Reduction Co., Inc., Dept. C&E, 150 E. 42nd St., New York 17, N. Y., or use the Request Card at page 18. Circle No. 16.

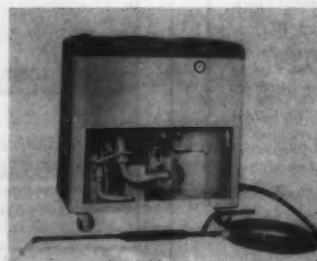
For more data on any item, circle indicated number on card at page 18.

#### Compact steam cleaner produces 130 gph

The Model 130 steam cleaner, designed to deliver 130 gallons of cleaning solution per hour, is announced by the Malsbary Mfg. Co.

The oil-fired, caster-mounted model measures 45 inches long, 21 inches wide, and 43 inches high, and weighs 565 pounds. Tricycle and trailer mounts are optional. A gas-fired stationary model is also available.

For further information write to the Malsbary Mfg. Co., Dept. C&E, 845 92nd Ave., Oakland 3, Calif., or use the Request Card at page 18. Circle No. 97.



easy does it... everytime

#### WISCONSIN TILT TRAILERS

Model 1020 for safe, fast, economical, one-man loading, unloading of equipment up to 12 tons. Automatic hydraulic EASY UP... EASY DOWN deck, and low load angle saves time every haul. Doubler plates at all critical welds... exclusive rear channel mounting assures permanent strength... won't tear out EVER!

Model 1020 only \$1525 w/tires & deck, plus freight and tax

**WISCONSIN TRAILER COMPANY, INC.**

Richfield, Wisconsin Phone HUBERTUS 1111

For more facts, circle No. 412

#### 4000 to 90,000 GPM

Keep jobs moving with BARNES construction pumps!

27 Self-Priming Centrifugal Pumps engineered to move more water faster on excavating, mining and general construction jobs... prime and reprime without fail even during intermittent service. Portable Diaphragm models to handle semi-solid seepage faster, too. All constructed and pre-tested to give you Barnes Blue Ribbon Quality!



**BARNES**  
Barnes Manufacturing Co.  
Mansfield, Ohio

Get a FREE copy of our Construction Pump Selector No. 230 from any Barnes distributor.

For more facts, circle No. 413

CONTRACTORS AND ENGINEERS



Use the  
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or Described  
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Issue



### Hot-oil heater needs no protective building

The new hot-oil heater offered by Littleford Bros., Inc., is a complete package designed for use with asphalt plants, as well as prestressed-concrete and ready-mix-concrete operations.

It can produce heating oil of 450 degrees F without need of a protective building. The design utilizes the oil expansion tank; under it are nested all operational controls and drives, protected at the sides by removable doors. The heater is said to be lightweight, compact, easy to install, simple to operate, and completely safe.

The pressure control automatically shuts down the burner if a leak develops in the piping connections, thus allowing the hot oil to escape and preventing the heater from burning up due to lack of transfer oil. The relief valve of the pump protects against excessive oil pressure.

A 24-hour timer permits completely automatic operation.



On the new Littleford hot-oil unit, a 24-hour timer permits completely automatic operation; heating is done at one time rather than periodically throughout the day.

For further information write to Littleford Bros., Inc., Dept. C&E, 487 E. Pearl St., Cincinnati 2, Ohio, or use the Request Card at page 18. Circle No. 80.

### Tapered steel girder for roofs and floors

A tapered girder for roofs and floors of buildings is available from the Shlagro Steel Products Corp.

The new girder consists of three plates—top and bottom flanges and web—which may be varied in size according to structural needs. By varying the taper, inverting the beam, cantilevering, and by other combinations of tapered girders, many types of roof and floor systems are made practical, states the company.

The girder is available in lengths from 24 to 130 feet.

For further information write to the Shlagro Steel Corp., Dept. C&E, 86 Washington Ave., Somerville 43, Mass., or use the Request Card at page 18. Circle No. 105.



### New Modern Design —Sound Engineering

produced this outstanding

## WARRINGTON—VULCAN Single-Acting STEAM PILE HAMMER

Heavy ribs give more support  
to cylinder head . . .  
Shorter channels permit easier insertion  
of hammer into leaders . . .

Operating at a medium steam pressure this versatile hammer delivers a moderate frequency of low velocity blows from a relatively heavy ram. A favorite for driving piles of all descriptions. Made in 6 sizes with Rated Striking Energy from 825 ft. lbs. to 30,225 ft. lbs.

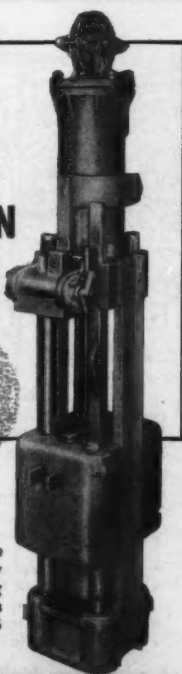
Ask for full information



VULCAN IRON WORKS INC. 327 North Bell Avenue, Chicago 12, Illinois

Manufacturers of Pile Driving Hammers Since 1852

For more facts, use Request Card at page 18 and circle No. 414

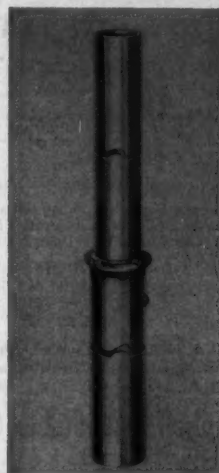


### Introduce new line of hydraulic cylinders

The Joyce-Cridland Co. has introduced a new line of single-acting hydraulic cylinders that range from 4 to 18 inches in diameter, in lengths to suit requirements, and with capacities up to 75,000 pounds.

Featuring high horizontal stability, the cylinders are available with operating pressures up to 500 psi. A top bolt ring for attachment to the working surface is standard equipment.

For further information write to the Industrial Division, The Joyce-Cridland Co., Dept. C&E, 2027 E. First St., Dayton 3, Ohio, or use the Request Card at page 18. Circle No. 73.



## ESSICK VIBRATING COMPACTORS



Essick VR-28-W Self-Propelled Vibrating Compactor on Golden State Freeway

### COSTS CUT IN HALF . . . PRODUCTION TRIPLED . . . SPECIFIED DENSITIES EXCEEDED . . . ESSICK 28" VIBRATING COMPACTOR OUTPERFORMS OTHER EQUIPMENT ON SOIL OR ASPHALT

Charlie Brown of the Chas. T. Brown Construction Company states:

"We were working on the Golden State Freeway in Los Angeles, compacting backfill around bridge abutments and drainage pipes. At the start of the job, compaction costs were running about \$1,300 per month per compaction unit which consisted of a compressor and three pneumatic tampers.

"Having successfully used Essick Vibrating Compactors on other projects, we felt that we could get better densities at less cost in the confined areas of this job with the Essick 28" self-propelled vibrating model.

"We put the Essick VR-28-W to work and cut monthly costs to about \$650 per compaction unit (about one-half), tripled our production, and exceeded our best past compaction performance. Being self-propelled, the Essick 28" Vibrating Compactor is just the ticket for backfill operations on soil and in hard-to-get-at locations. It gives the most compaction at the least expense, and exceeds specifications in record time."

Many Contractors are finding that the 965 lb. VR-28-W, with its High Frequency Vibration, exceeds the compaction of a sixteen-ton static roller on soil. This multiple purpose tool has also revolutionized highway maintenance by putting down better asphalt patches at greatly reduced costs. Carrying hooks make it completely mobile, and being self-propelled, it will go just about anywhere compaction is required.

SEE YOUR ESSICK DEALER FOR A DEMONSTRATION



9 Models of Vibrating Compactors from 13" to 72" widths

Also 14 Models of Tandem Rollers from 1/2 to 14 Tons

### ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVENUE  
LOS ANGELES 21, CALIFORNIA

850 WOODRUFF LANE  
ELIZABETH, NEW JERSEY

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

For more facts, use Request Card at page 18 and circle No. 415



## Campbell Cab for "Caterpillar" Tractor

D7-210 for D7 17A series tractor and  
D7-224 for D7 3T series tractor

**WINDOWS**—safety glass windows throughout. Sliding windshield glass.

**CONSTRUCTION**—all steel.

**COLOR**—painted yellow to match color of tractor.

**DOORS**—two heavy-duty sliding doors provide easy entrance and exit for the operator. Doors can be latched in an open or closed position.

**MEASUREMENTS**—

	D7-210	D7-224
length	56"	length 54"
width	65"	width 65"
height	58"	height 58"

**OPTIONAL EQUIPMENT**—windshield wiper, sun visor, locking handles, heater-defroster unit.



**Campbell Detachable Cab Co. • Wauconda, Illinois**

For more facts, use Request Card at page 18 and circle No. 416



**BITUMINOUS DISTRIBUTOR**  
Front or rear mounted for truck or trailer  
... with pressure metering.



**MAINTENANCE UNIT**  
Heating and spraying unit ... 2-wheel  
or truck mounted.



**STREET FLUSHER**  
Truck mounted as shown or 2-wheel  
model for towing.



**ASPHALT KETTLE**  
2-wheel pneumatic mounted ... hand or  
power spray.

Smartest buys of the year

## ROSCO ROAD EQUIPMENT

for construction and maintenance of  
highways, streets and airports



**ROLLER**  
9-wheel self-propelled ... torque con-  
verter, power brakes and steering.



**ROSCO-PACTOR**  
9 or 13 wheel roller ... 90 to 125 cubic  
foot capacity.



**ROAD SWEEPER**  
Two-way ... power driven ... full 4-wheel  
trailer mounted.



**STREET CLEANER**  
Power driven ... for sweeping and  
flushing.

Years of use by satisfied customers prove Rosco machines are built to last ... built to turn out a top-notch job every time. For full details on the dollar-saving specifications ask for literature on the equipment you need.

**Rosco**  
MINNEAPOLIS

**ROSCO MANUFACTURING CO.**  
3118 SNELLING AVE. • MINNEAPOLIS 6, MINNESOTA

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| <input type="checkbox"/> Bituminous Distributor | <input type="checkbox"/> Street Flusher | <input type="checkbox"/> Roller       | <input type="checkbox"/> Road Sweeper   |
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Please send literature checked below to:

Name \_\_\_\_\_ Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_

For more facts, use coupon or Request Card at page 18 and circle No. 417

## Electronic surveying system now redesigned

A new model of the Tellurometer Micro-Distancer is announced by Tellurometer, Inc.

Designated Model MRA-2, its design permits interchangeability of component units: either unit may be used as the master or the remote, so that readings may be taken from either end of a line.

The power pack, heretofore a separate accessory, has been built directly within the instrument body. The size has been reduced to 14x10½x10½ inches.

The Model MRA-2 will operate in temperatures ranging from 40 degrees below zero to 120 degrees above, states the manufacturer. It can be used with a standard 12-volt automobile battery or similar power source.



On the new Tellurometer system, the built-in radio communication system has been redesigned and a lightweight headset added so that the operator's hands are free.

For further information write to Tellurometer, Inc., Dept. C&E, 24 Dupont Circle Bldg., Washington, D. C., or use the Request Card at page 18. Circle No. 19.

## Pitman arm puller set for servicing trucks

A new puller set that easily services the hard-to-reach, boxed-in pitman arm on cab-over or tilt-cab model trucks is announced by the Owatonna Tool Co.

The set includes two puller bodies for various pitman arms and three special puller hex nuts to fit the steering-gear lever-shaft thread size. Any appropriate size of wrench turns the hex nut that transmits power to the puller, removing the arm from the steering-gear lever shaft without damage to parts.

For further information write to the Owatonna Tool Co., Dept. C&E, 381 Cedar St., Owatonna, Minn., or use the Request Card that is bound in at page 18 of this issue. Just circle No. 6.

## New safety headgear is strong, lightweight

Bausch & Lomb announces a complete line of safety hats, available in a choice of Fiberglas, aluminum, and plastic.

Contour-fit suspension is a feature, and lock straps assure minimum crown clearance of 1¼ inches. A numbered snap-in adjustment provides quick, easy fitting to any head size from 6½ to 8.

Accessories include a full winter liner for cold-weather protection or a half liner that is suitable for year-round wear.

For further information write to the Safety Products Dept., Bausch & Lomb Optical Co., Dept. C&E, 430 St. Paul St., Rochester 2, N. Y., or use the Request Card at page 18. Circle No. 96.



**ON THE JOB**  
... ON THE TOUGHEST JOBS

**ARCTIC BOY**

portable water coolers

... built to take a beating on construction jobs, in mines, on the farm, railroad crews, on service trucks ... wherever men work and the going is rough.

They keep drinking water cool and sanitary, keep worker efficiency up. And note these features:

- HOT DIPPED Galvanized or stainless steel insets
- Sparkle plastic liner ... non toxic, prevents corrosion
- Large opening, easy to ice and clean
- Extra large insulation space

Send for free booklet  
"Care and Use of Your  
Cooler." Write Dept. C-4  
SCHLUETER MFG. CO.



St. Louis, Mo.

For more facts, use Request Card at page 18 and circle No. 418



CONTRACTORS AND ENGINEERS



## Power trowels designed for operator convenience

Two new gasoline-powered concrete-finishing trowels have been announced by the Remington Arms Co., Inc.

Incorporating new features designed to provide maximum convenience to operators, the two units are the Model T-434 with a 34-inch blade sweep, and the Model T-428 with a 24-inch blade sweep.

The T-434 is powered with a 3-hp Briggs & Stratton engine, the T-428 with a 2½-hp unit. Both tools.

Major features include blade-pitch controls and engine controls with



safety throttle releases both mounted on the handles. The tools also have automatic clutches, and the engines are mounted on rails for easy belt

changing and adjustment.

The T-434 is equipped with quick-change knobs so that no tools are needed to change blades.

Optional accessories include reversible floating blades and reversible finishing blades.

For further information write to the Remington Arms Co., Inc., Dept. C&E, 939 Barnum Ave., Bridgeport, Conn., or use the Request Card at page 18. Circle No. 57.

## Heavy-duty vibrator has 4¾-inch head

The Dart Mfg. Co. announces a large, one-man air vibrator designated the A-49 Alaskan.

Featuring 40,000 vibrations per minute with a 4¾-inch-diameter head, the 60-pound unit is designed for heavy mass placement of low-slump concrete with large aggregate.

A 3-stage refrigeration system minimizes internal icing of the exhaust and prolongs bearing life. The system has no moving parts and requires no maintenance or service for the life of the vibrator.

Under full load characteristics, the Alaskan uses 87 cfm of air at 9,000 rpm and 90 pounds throttle.

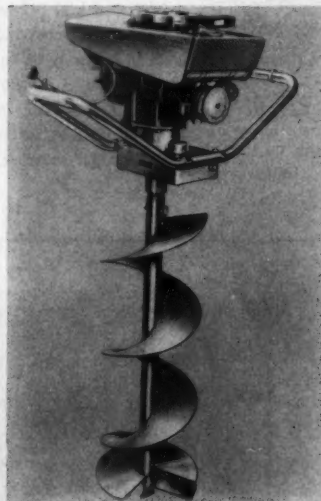
For further information write to the Dart Mfg Co., Dept. C&E, 1002 S. Jason St., Denver 23, Colo., or use the Request Card that is bound in at page 18. Circle No. 78.

For more facts on these products, circle the indicated number on the Request Card at page 18.

## Portable power drill digs fast in all soils

The General Equipment Co. announces a portable power drill that features a new low-torque single-blade-pattern earth auger designed to dig faster, more smoothly, and with less operator effort in all kinds of earth. It is especially suited for drilling in sticky clay soil.

Manganese steel blades are a feature, and a new screw-type pilot

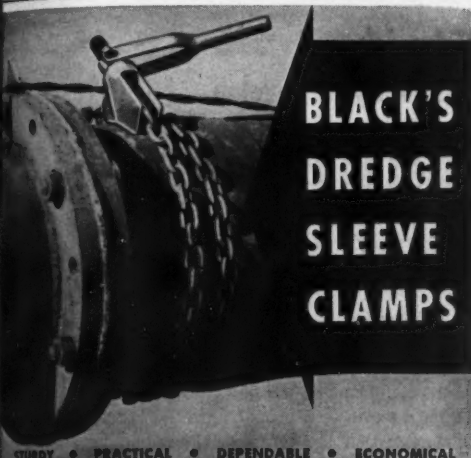


point pulls more easily. The 27-inch-long continuous auger flight carries aggregate out of the hole as it deepens.

The drill is available with augers in 4, 6, 7, and 8-inch sizes. Power is supplied by a Clinton 2½-hp air-cooled engine. A centrifugal clutch engages automatically when the throttle is pressed and disengages when the throttle is released, stopping the auger while the engine idles.

Augers in a variety of sizes from 2 to 8 inches in diameter are available for special uses.

For further information write to the General Equipment Co., Dept. C&E, Box 134, Owatonna, Minn., or use the Request Card at page 18. Circle No. 114.



## BLACK'S DREDGE SLEEVE CLAMPS



Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U. S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply . . . positive in action. Write for illustrated folder, today.

The Black Brothers Co., Inc., 910 4th St., Mendota, Illinois

For more facts, circle No. 419

## HYDRAULIC PIN PULLER for CONCRETE FORM PINS



FAST • EFFICIENT  
ECONOMICAL  
DEPENDABLE

THE COMPACT SIMPLICITY and high speed performance designed into this tool makes it possible for one man to pull effortlessly several hundred form pins per hour regardless of pin length or form size.

HYDRAULIC MOTOR OPERATED with single-hand lever propels machine both forward and reverse for easy maneuverability and quick spotting over the pin.

FOR FURTHER INFORMATION and free demonstration, consult your local PEMCO dealer or contact factory direct.

**PEMCO, INC.**

7 North Roselle Road,  
Roselle, Illinois

For more facts, circle No. 420

## MOBILE OFFICE UNITS...



Save TIME... and MONEY!!!

MOBILE OFFICE Units are low in cost . . . Built to your specifications . . . There's a unit to fill your every need.

Because MOBILE OFFICE Units are easy to move from job to job, they enable you to have office, engineering, paymaster and other facilities at every point of your operation.

These units are economical, time saving, rugged and durable. They are self-contained, and are available with air-conditioning, and can be fitted to your specifications.

MOBILE OFFICES are being used by major contractors and other major businesses throughout the United States. In every case they have proven their worth.

Remember, whatever your needs may be, a MOBILE OFFICE Unit can be built to fill your requirements.

If It's Mobile . . . We Build It!

**MOBILE OFFICE, INC.**  
Phones: DOrchester 3-1048-9

7314 Stony Island Avenue, Chicago 49, Illinois  
For more facts, circle No. 421

## NEW! JOHNSON® light-weight CONCRETE BUCKETS

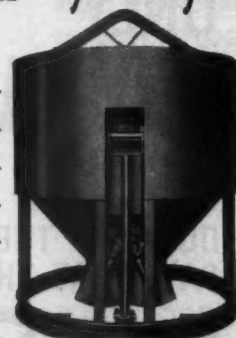
SIZES:

½ cu. yd. . . .  
¾ cu. yd. . . .  
1 cu. yd. . . .  
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NET WEIGHT\*

..... 355 lbs.  
..... 455 lbs.  
..... 700 lbs.  
..... 840 lbs.  
..... 1075 lbs.

\*approx.



Light in weight, low in cost, this all-new series of concrete buckets from Johnson gives high ratio of capacity-to-weight. Makes each pour more profitable for you! Features: all-welded steel hopper, frame. All working parts above discharge point and well

within bucket outline—protected during work, storage, shipment. 30° slope of cone bottom gives complete discharge of medium-slump concrete. Short-stroke, easy leverage handle. Double-clam gates. Stainless steel shafts in nylon bearings. Write today!

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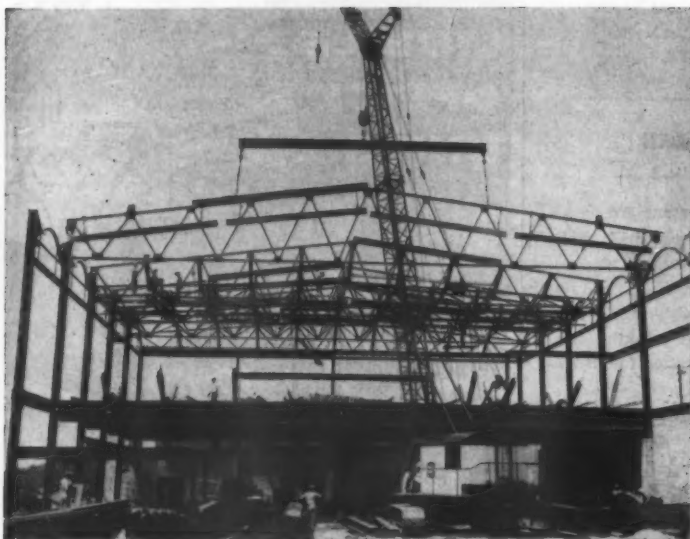
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The first big problem for the contractor on Bethlehem Steel's new research facilities atop South Mountain, Bethlehem, Pa., was posed by the site itself. The terrain is being left irregular to provide a contoured landscape for the buildings. Access was by one all-purpose roadway for trucks and construction machinery. Less than four acres in three locations on the 50-acre site could be used for material storage, making it important to adhere to a rigid schedule of delivery.



Steelwork for the shop and warehouse was another unconventional job. Heavy machinery requires floors to carry a live load of 300 pounds per square foot, but the building will have a feeling of lightness because of exposed roof trusses made up of pipe sections instead of angles and plates. This crane fitted with a 40-foot spreader bar is inching a pipe truss into place.

(Additional photos on facing page)

**Research-laboratories job  
keeps contractor thinking to develop**

## Methods best suited to many kinds of work

Unusual site conditions and the design of Bethlehem Steel Co.'s research facilities being built atop South Mountain in Bethlehem, Pa., produced many problems for the contractor. But for every construction problem—whether it's how to keep dirt-caked green trees burning during land-clearing operations, or how to build hard-to-reach cribbing wall without a crane, or how to erect very limber 96-foot-long pipe trusses—the contractor has come up with an economical solution.

The terrain of the mountain top was left irregular to provide a natural background for all buildings on the 50-acre site. The offices and laboratories building on the eastern side is the focal point of the project. The main entrance of this building will overlook a plaza, and beyond the plaza will be a 200-foot-diameter cooling pond to serve the building's air-conditioning systems.

West of the pond will be the process metallurgy pilot plant, and south

(Continued on page 170)

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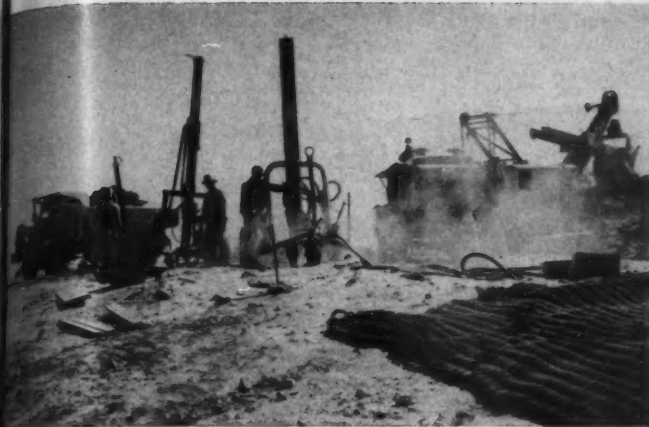
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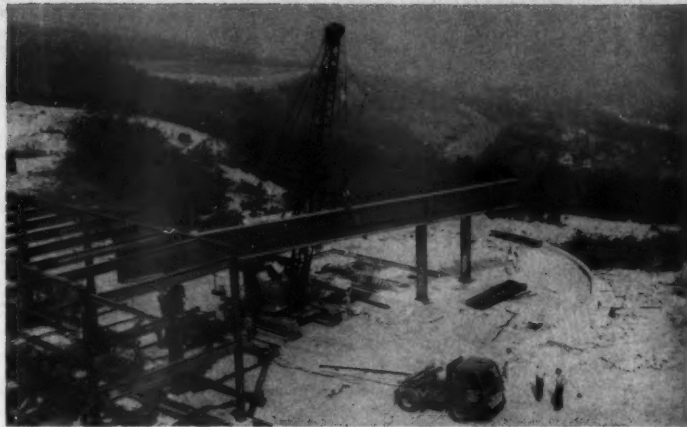
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CONTRACTORS AND ENGINEERS





Drilling and blasting posed other problems. Hollow-drill carbide bits, used to get more depth, were often choked by rock cuttings so that the hole could not be blown. When this happened, a drop of weld metal was used to plug the hole so that it could be blown every few feet. Gardner-Denver wagon drills are fed by a Jaeger portable compressor. Blasted rock is loaded out by the P&H, right, to Euclids.



A giant 90-foot-long 6-foot-deep girder for the cafeteria wing of the office and laboratories building is hoisted into place by a long-boom crawler crane. Structural steel fabricated at the Bethlehem plant was brought directly to the site by trailer trucks and erected. Special fabricated pipe trusses for the job were trucked from the company's Steelton works, 90 miles away.



Two unusual aspects of cribbing-wall construction: 6-foot-long precast members are being used; they are set by an Econmobile loader fitted with a job-built extension that gives the rig a 30-foot reach. This extension, with crane-hook attachment, eliminated the need for shelving or a crane with a long reach. In 5 minutes, the crane hook can be replaced by a 1/2-yard bucket for concrete work.



Three trenching methods were tried for the 10 1/2 miles of pipeline to be installed at the site for sewers, pneumatic tubes, and heat, gas, water, and electrical lines. The one finally adopted allowed crews to reach production of as much as 140 feet per day. A drill first took borings to spot rock locations so that they could be blasted. With the rock out of the way, this spread moved in. A backhoe excavated 20 feet ahead of the pipe-laying crew.



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169

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HEAVIER • MORE CAPACITY**

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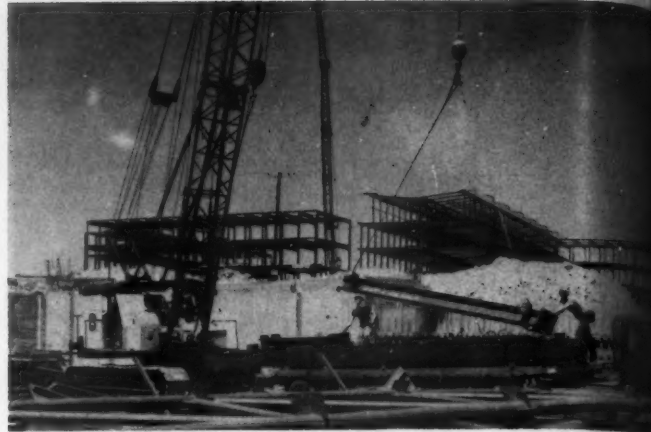
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APRIL, 1960





Plenty of rock deposited during the Ice Age on the north side of the mountain made drilling and blasting tough. Three wagon drills are fed by Jaeger and Ingersoll-Rand air compressors. At right, a Euclid is being loaded by a shovel. Blasting was scheduled at noon or at the end of a shift when the site was almost deserted.



A crane picks a steel girder off the trailer pulled by an International truck at the site of the shop and warehouse building. Pipe trusses, foreground, separated by timber planking, will be used in the roof of the structure. Care had to be taken in stockpiling material in crowded, designated areas.

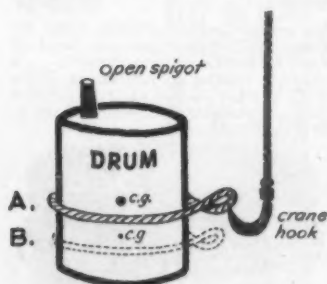
(Continued from page 168)

of it will be a shop and warehouse building. The publication department's photography building will be on the western part of the site. Smaller structures include a boiler plant, substation and control house, and a gas-meter house.

#### Land-clearing work

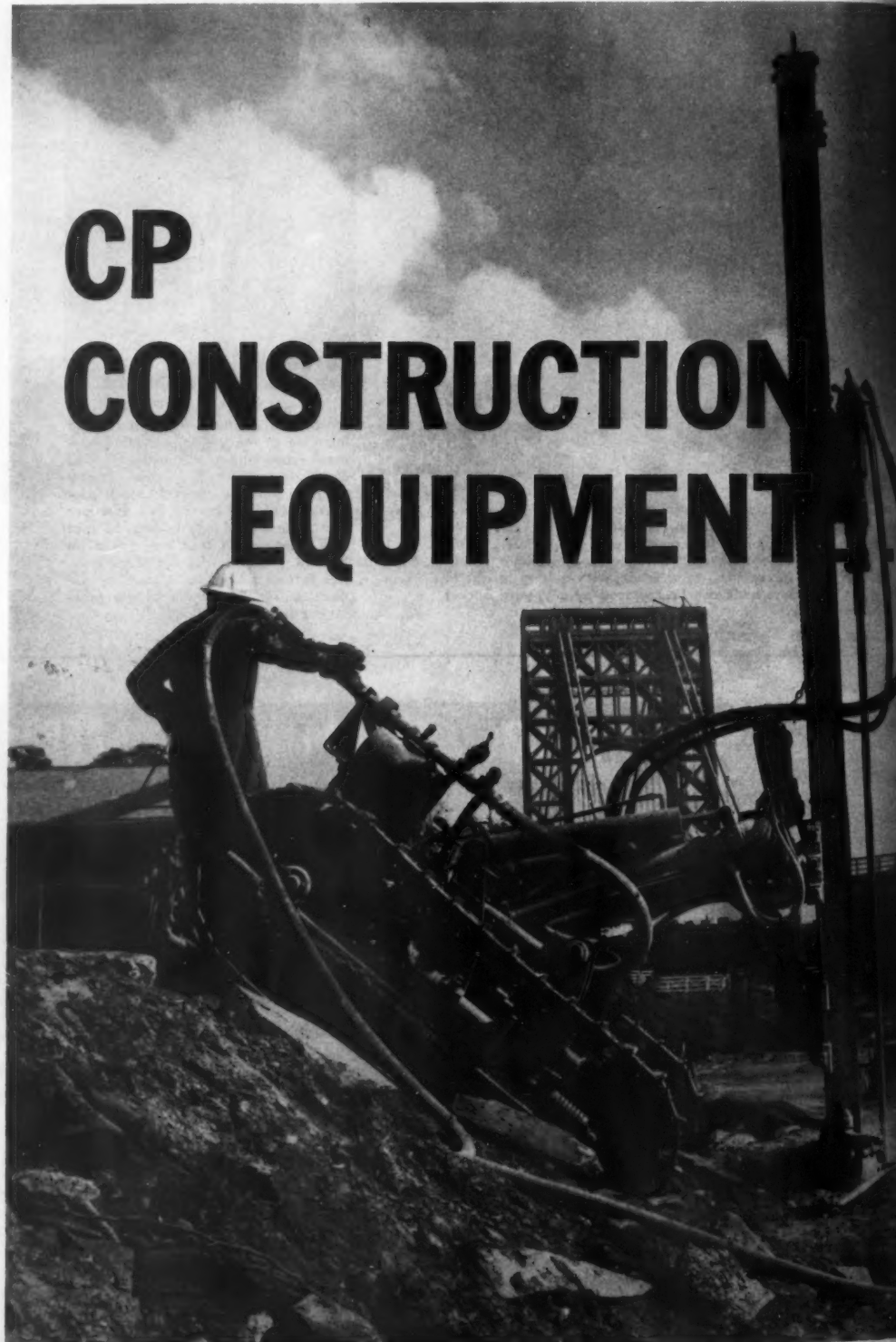
Turner Construction Co., New York City, is the general contractor on this multimillion-dollar project. American Construction Co., Hartford, Conn., handled the land-clearing and grubbing operations. About 47 acres had to be cleared of scrub brush and 4 to 8-inch-diameter trees. Six-man chain-saw gangs and four crawler tractors—a Caterpillar D8, two Allis-Chalmers HD-20's (one with a grubbing tool), and an HD-16—first carved out the main 3,000-foot-long access road. Then the four tractors, plus a Bay City 10-ton crawler crane with clamshell, took over the rest of the job.

Though the trees were green and caked with earth, it was cheaper to burn them than to cart the timber off the site. To make them burn, the contractor stacked them on a layer of old rubber tires and drenched the pile with No. 2 fuel oil. A typical pile measured 25 feet high and 50 feet across, and about 1,800 tires were used in all. To reduce the hazards of adding fuel to a live fire, a 55-gallon drum of fuel oil, fitted with a spigot, was lifted by a sling attached to the crane and swung over the pile. When



This is how the contractor added fuel to a live fire of green trees. The nearly full 55-gallon drum, with the sling below the center of gravity (A), is lifted by a crane hook, and the drum tilts to pour fuel out of the open spigot. For the next application of fuel, workmen slide the sling below the new center of gravity (B), and the process is repeated.

# CP CONSTRUCTION EQUIPMENT



G-800 TRACDRIL adapts quickly to bad ground . . . automatic brakes insure operator safety and hold drill in position.





A P&H 2 1/2-yard shovel loads out shot rock to a Euclid truck, which will haul it to the fill areas. The fill was used to extend the plateau to provide parking areas.

the drum was tilted, oil automatically ran out of the spigot.

Before digging any basements or trenches, American Construction moved about 90,000 cubic yards of general earthwork to terrace and level the site. Grading was kept to a minimum to provide an adequate setting for the buildings and produce balanced cuts and fills. The fill was used to extend the plateau to provide parking areas. Reinforced-concrete retaining walls and cribbing were used to retain fill slopes where natural slopes were steeper than 1 to 5.

#### Drilling, blasting rock

The north side of the mountain contains limestone, granite, quartz, sand, silt, copper, iron, and gneiss, while the south side is virtually free

of rock. Blasting was so scheduled that drilling and shooting were done around noon or at the end of the shift, when the work site was virtually deserted. A Northwest 2 1/2-yard shovel loaded out most of the shot rock into Euclid haul trucks, which dumped the fill on low areas.

The rock took a heavy toll on drill bits. The drilling crew went through as many as 18 bits a day. A steel bit lasted about 5 feet; hollow-drill carbide bits lasted for as much as 125 feet of hole. Often rock cuttings choked the carbide bit, and workmen couldn't blow the hole. To remedy this, a drop of weld metal was used to plug the hole. Then, the hole could be blown every few feet to get more wear out of the bit and higher production from the crew. The contractor worked as many as five wagon drills—Gardner-Denver, Worthington, and Ingersoll-Rand—at a time and fed air to them with Ingersoll-Rand, Joy, and Le Roi portable air compressors.

From 125 to 1,200 pounds of 1 1/4 to 1 1/2-inch semi-gel Hercules powder was used per shot, depending on the depth and extent of rock to be removed. Primer cord was used to minimize the danger of flying rock; 12x12-foot blasting mats were placed over the charge near buildings and in trenching work to help confine the blast.

#### Three trenching methods

American Construction had 10 1/2 miles of trench to dig for three separate sewer lines, a water-distribution system, a pneumatic-tube line, electrical conduit, an exterior lighting system, and heat and gas lines. The trenches were as deep as 22 feet and measured 3 or 4 feet wide at the bottom. No sheeting or shoring was needed, since the side slopes conform to the natural angle of repose of the material being trenched through.

Three different trenching techniques were tried. The first method involved digging out a little more than 20 feet of trench; drilling and shooting any rock encountered; back-filling with sand to sewer invert grade; and installing a section of corrugated-metal pipe. The 20-foot pipe sections, 12 to 48 inches in diameter, were double-dipped in asphalt and their paved bottoms reduced friction. Each section was tied into a previously laid section with a corru-



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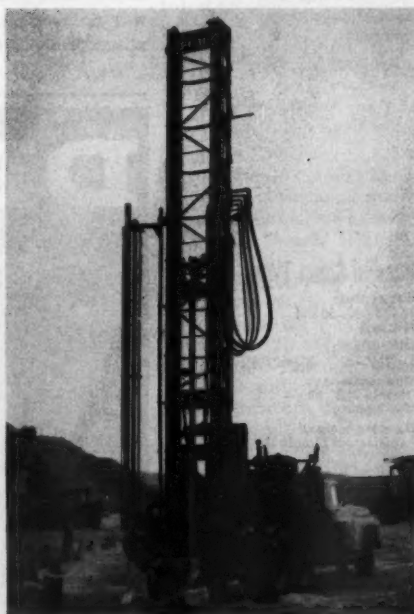
DEEP-HOLE DRILLS, for example, built to take the hardest pounding any other, insure a stable drill mount on the toughest ground you'll drill or tramping, all controls are easy to reach. And heavy-duty hydraulic cylinders quickly position drill carriage . . . productive drilling time. Safety insured by automatic brakes hold the instant traction motors are stopped. Hard-hitting Deep-Hole Drills sink 3" holes to 75 feet in hard, igneous rock.

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T-650 REICHdrill truck mounted, with Hydraulic Barrel Loader. Hole size: to 7 1/4"; down-pressure to 30,000 lbs.



A Drott Skid-Shovel dumps spoil into a haul truck. Before any basements or trenches were dug, about 90,000 cubic yards of general earthwork was done to terrace and level the site. Grading was minimized to provide adequate setting for the buildings and yet produce balanced cuts and fills.



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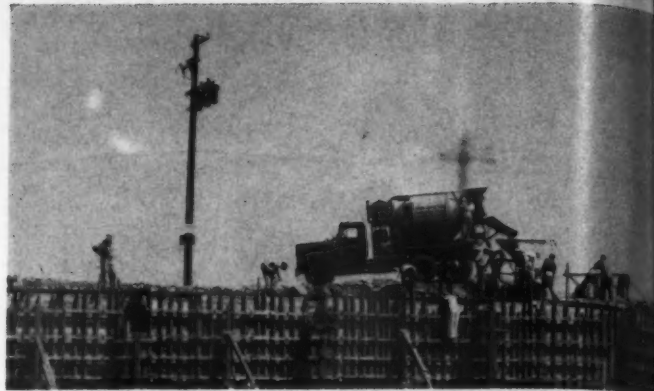
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APRIL, 1960





Storage space is at a premium. Bethlehem steel forms for concrete floor slabs are stockpiled on building floors as soon as steel-framing work permits. Shipments were carefully scheduled. Materials were stockpiled so that those to be used first were at the top or in front of the others.



A Worthington 6-yard mixer dumps concrete into wall forms. Several methods of forming and concrete placing were used. Both wood board and plywood forming were employed; placement was made directly from truck mixers, with push buggies and on deep pours with elephant trunks.

(Continued from preceding page)

gated metal ring held in place by a galvanized steel band. After the trench was backfilled, another 20-foot section was tackled. Although this was a simple and safe method, production was not high.

A second method, involving longer runs, was tried. The drilling and trenching crews opened a run of about 200 feet ahead of the pipe-laying crew. This provided a buffer section that allowed the pipe-laying crew to keep on working. Production was higher, but too much trench was left open.

The contractor went to a third method that combined the safety and simplicity of the first and the no-delay advantage of the second. The length of the sewer line was first staked out. A crawler-mounted Le Roi Tractair drill crept over the course, taking borings every few feet to spot rock locations. The Tractair continued on its run, and the rock was blasted. Thus, when the Northwest backhoe started trenching, there was no rock. It dug 20 feet or so ahead of the pipe-laying crews and



#### Synclinal Sump Type

**Capacities:**  
5-8-10-20-30-50-75  
and 100 G.P.M.  
**Pipe Sizes:**  
1/4"-1"-1 1/4"-1 1/2"-2"-  
2 1/2" and 3".  
**Connections:**  
Coupling—Male Nipple.  
**By-pass Valve:**  
Not Available.



#### Synclinal Line Type

**Capacities:**  
5-8-10-20-30-50-75  
and 100 G.P.M.  
**Pipe Sizes:**  
1/4"-1"-1 1/4"-1 1/2"-2"-  
2 1/2" and 3".  
**By-pass Valve:**  
Not available.  
**Operating Pressures:**  
Up to 80 p.s.i.



#### Bonded Line Type

**Capacities:**  
10-20-30-50 and  
75 G.P.M.  
**Pipe Sizes:**  
1"-1 1/4"-1 1/2"-2" and 2 1/2".  
**By-pass Valve:**  
Available with or without.  
**Operating Pressure:**  
Up to 250 p.s.i.  
**Operating  
Temperatures:**  
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**Capacities:**  
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**By-pass Valve:**  
Available with or without.



#### Tandem Sump Type

**Capacities:**  
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150 and 200 G.P.M.  
**Pipe Sizes:**  
1/4"-1"-1 1/4"-1 1/2"-2"-  
2 1/2" and 3".  
**Connections:**  
Coupling—Male Nipple.  
**By-pass Valve:**  
Not available.



#### Bonded Sump Type

**Capacities:**  
10-20-30-50 and  
75 G.P.M.  
**Pipe Sizes:**  
1"-1 1/4"-1 1/2"-2" and 2 1/2".  
**Connections:**  
Coupling—"O" Ring—  
Male Nipple.  
**By-pass Valve:**  
Available with or without.

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CONTRACTORS AND ENGINEERS





The rocky site made foundation work a little unusual. A Vulcan No. 1 air-driven single-acting hammer drives in 10-inch 40-foot-long H-piling to rock or refusal. The terrain was such that one pile went 20 feet deep; another nearby, only 5 feet deep.

maintained the pace all day. Production reached as high as 140 feet per day.

Foundation work for the different buildings was similar. A 2½-yard shovel loaded a fleet of Euclid haul trucks. When rock was found, a 1½-yard backhoe exposed it for the auger drills, and the rock was blasted. Foundations were normally concrete spread footings on rock. In areas free of near-surface rock, steel piles were used to support the structure through friction and point bearing.

The crane used a Vulcan No. 1 air-driven single-acting hammer to drive the 10-inch H-piling to rock or refusal. Pile lengths varied. Usually a 40-foot-long pile was inserted in the crane leads, was driven home, and the excess cut off. The terrain was such that one pile would go 20 feet deep, while another a few feet away might go only 5 feet deep.

Forms for footings and retaining walls were made in Turner's shops. Wood board forms were used for concrete below grade, and plywood for exposed concrete. Where possible, concrete was chuted directly into the

forms. On deep pours, the workmen used elephant trunks to prevent segregation of the mix. When truck mixers could not get to the forms, they fed a fleet of push buggies.

Hard-to-reach places were served by a rubber-tire Econmobile loader fitted with a ½-yard bucket. The loader also built cribbing walls that are composed of precast-concrete members about 6 inches square and 6 feet long. The cribs are built in 3-foot-high stages and are backfilled with slag. Heights range from 6 to 17 feet. Construction of these walls generally requires a lot of shelling or a crane with a long reach. But the contractor handled the cribbing members with a crane-hook attachment replacing the bucket. A job-built extension was installed to give the machine a 30-foot reach. Change-over from crane hook to the concrete bucket takes only five minutes, so the rig was available for either job.

The 25,000 cubic yards of concrete for buildings and miscellaneous work was batched on the job. Generally, a concrete producer would have supplied this small amount from the

(Continued on next page)



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**180° BOOM SWING**—The Standard widely favored All-Hydraulic or Mechanical 180° swing boom crane models. Lifts, carries, and places any load up to 12½ tons. One engine powers the machine for travel and all crane applications—finger-tip control. Front traction wheel drive supports chassis and crane load. 2 geared speeds for hoisting, topping, and swinging. No tail swing—Boom never passes over Operator's head. Write for complete details in illustrated bulletin #79.



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(Continued from preceding page)

home yard with a fleet of truck mixers. But it would have taken at least 40 minutes for a truck to make a round trip to the mountain-top site, assuming there was no traffic.

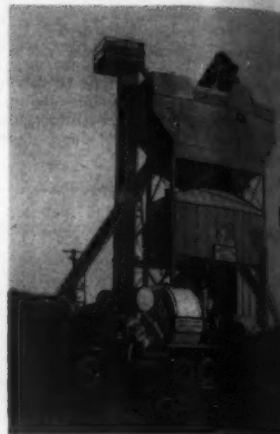
Because of this, Frank Casilio & Sons, Inc., Bethlehem, set up a Fanning-Schuett batch plant on the mountain slope, and trucked in and stockpiled sand, cement, and slag. The all-electric one-man-operated plant consists of a 175-foot-long conveyor running from the stockpile to a combination 200-ton aggregate and 200-barrel cement bin. The bin feeds a Worthington 2-yard premixer where water is added. The concrete batch spills onto a 40-foot-long conveyor that carries it to the mouths of Worthington 6-cubic-yard truck mixers. Since the concrete is already mixed when it is fed into the truck mixer, the load is agitated and the truck can carry more than 6 yards. Three to four truck mixers can handle this job's maximum requirement of about 200 yards per day, since the longest run for the mixers is less than half a mile away.

Concrete for high foundation walls was placed in stages. If wall forms had been built to full height, a lot of cutouts spaced about 10 feet apart would have been needed for the steel columns. But on this job, concrete was first placed to the column base-plate level. Then the structural steel was plumbed, bolted, and grouted. The rest of the wall form was erected to its full height around the steel columns, and concrete was tremied into place.

Since Bethlehem Steel plans to expand the research laboratories in the future, concrete that encases the electrical conduits and other power lines and substations is colored red. Red iron-oxide powder was added to the mix to give it color.

#### Storing materials

Only four acres in three locations of the 50-acre site were available for storage, general offices, and administration. These four acres are the material areas that will be landscaped later. Space was set aside for Turner's office and those of the 60 subcontractors, and for various facilities for up to 900 workmen.



A Fanning-Schuett plant was set up at the site; ready-mix trucks did not have to buck traffic on a long trip to the job.

The acreage was then divided into three sections. Lumber and plywood were stacked near the carpenter shop and sawmill; reinforcing bars were placed close to the buildings; and structural steel was ordered and placed so that the last piece to be erected was at the bottom of the pile.

Every shipment was marked. As shipments came in, the items were broken down and spaced in the three areas in such a way that if an item was placed in front of or atop another, it would be the first to go on. In the material total there were 3,000

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CONTRACTORS AND ENGINEERS



materials of Bethlehem structural steel, angles, beams, girders, open-web joists, anchor bolts, high-strength bolts, etc. Some 471 tons of fabricated reinforcing bars; 450,000 board-feet of lumber; 65,000 square feet of plywood; three miles of corrugated metal culvert pipe; more miles of drilled tile pipe, cast-iron and steel pipe; and such items as valves, fittings, and electrical conduit also had to be stored.

#### Unusual warehouse roof

Bethlehem Steel handled erection of the 2,924 tons of structural steelwork for the research buildings in the conventional manner. The 1,684 tons of steel for the 4-story 530x391-foot administration building was erected smoothly by a pair of crawler cranes. The 89 tons for the 78x125-foot boiler-house building was also handled by conventional methods.

Special work was required for the 12x12-foot shop and warehouse structure. Because of the weight of machinery in the building, the floors were designed to carry a live load of 100 pounds per square foot. To give the building a feeling of lightness and openness, the architects designed it with exposed roof trusses made up of pipe sections, rather than angles and plates. The intermediate roof steel was unusual. Wide W-shaped purlins and steel-pipe struts completed the connection.

The structural steel was fabricated in Bethlehem's plant, just down the mountain. The company's Steelton works, 90 miles away, fabricated the pipe trusses. The standard steel shapes required no special treatment, but the 11 pipe trusses did.

The trusses are made of 5-inch-diameter double extra-strong pipe, the kind generally used for high-pressure steam lines. They measure 30 feet long and 13 1/2 feet at the widest point, yet weigh only 5 1/2 tons

each. At the Steelton works, the trusses were loaded onto a long trailer for hauling to the job site. First, two 36-inch steel beams, 96 feet long, were placed 6 feet apart on the trailer bed. Timber planking was laid across the steel beams.

The truss was then hitched to a bridle sling attached at four panel points. One crane picked up the truss and laid it horizontally across the planking. The lower chord was placed in line with the right-hand edge of the trailer bed. The peaked upper chord extended beyond the trailer bed on the left-hand or driver's side of the bed. This allowed the driver to see the widest part of the load very clearly and made driving over the highway and through traffic easier.

The 90-mile drive took about 5

hours over 4-lane highways. Two trusses, separated by wood planking, were carried per trip. At the work site, one crane picked each truss off the trailer, using the bridle hitch connected to four panel points.

The pipe trusses were stored horizontally until needed. Since the cranes that erect the trusses had to work from within the building site, columns and floor beams were erected for a bay or two, and then the roof truss was framed in.

#### Roof erection

Actual erection of the 11 trusses required two cranes. All intermediate steel—the winged purlins and such—was laid out on the top-floor plank-

(Continued on next page)



Red concrete—concrete with iron-oxide powder added—will make it easy to find buried power lines in the future.

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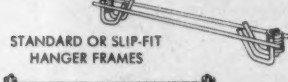
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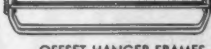
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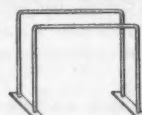
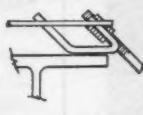


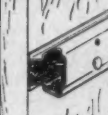
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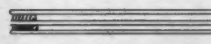
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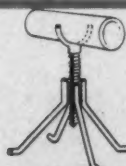
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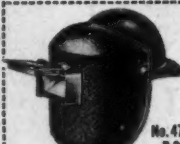
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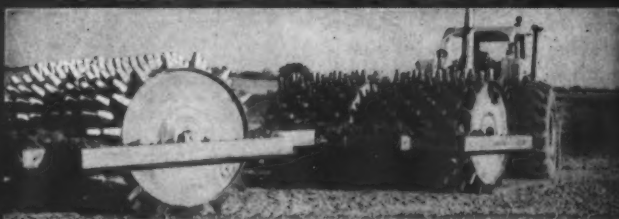
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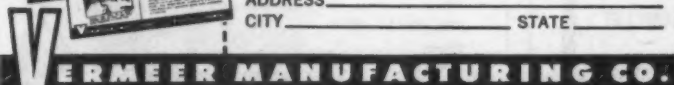
## LOWEST PRICED BIG DITCHER ON THE MARKET

The self-propelled POW-R-DITCHER digs at variable speeds, 8 to 24 inches wide and down to 6 feet deep. The 524T POW-R-DITCHER is a one-man operated, highly maneuverable unit. Large two-way conveyor deposits dirt on either side of ditch. Has hydraulically controlled steering with separate steering lever for each crawler track. Especially designed for digging wide foundation footings, gas, water and sewage lines. The POW-R-DITCHER is low in price... low in maintenance cost.



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(Continued from preceding page)

ing just about where they would fit into the roof. A long-boomed crawler crane, fitted with a 40-foot spreader bar, upended the truss. This steel balance beam was attached at two panel points on the upper chord. As the crane drew in its load line, the truss tilted up into a vertical position and was raised to the building roof.

While this crane held the truss, another crane fed the purlins and other members to the crew, which made the connections with high-strength bolts to free the cranes as quickly as possible. Later the crew welded all the bracing connections. The trusses were spaced 20 feet 2 inches apart.

### Road system

Three approaches—from the north, south, and west—will provide access to the laboratories. One all-purpose roadway, without a final finish course, is being used as the construction road. After the heavy trucks and construction machinery leave the work site, a final course will be laid, making the roadway suitable for traffic.

The road system is designed for safe driving at speeds up to 40 mph, although much of Mountain Drive—the present construction road—can be safely driven at higher speeds. Maximum grade is 9½ per cent. A typical cross section consists of a 2-lane 2-way curbed roadway, 22 feet wide with 10-foot-wide shoulders. In rock cuts, the shoulders are 8 feet wide.

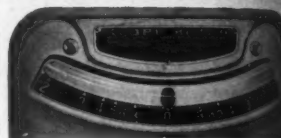
The bituminous macadam pavement is made up of a 3-inch base course and a 2-inch finish course constructed on a 6-inch slag base. The mountable-type curbs are of portland-cement concrete. Corrugated-metal pipe is used in the drainage system. Guardrailing is steel, anchored to steel I-beam posts.

### Personnel

Jerry Flannery is the field supervisor for the architects, Vourder Walker Smith Smith & Haines, Clark & Rapuano is the consulting engineer and landscape architect. James P. is project superintendent for Turner Construction Co.; Louis Pergiovanni for American Construction Co. John Casilio directed work for Frank Casilio & Sons, Inc., concrete supplier. Steel erection was under the direction of G. P. Bullard, manager of the Eastern erection district of the Fabricated Steel Construction Division, Bethlehem Steel Co. Bethlehem also had Peter Facchiano as resident engineer and J. D. McGinley as project manager.

## Automatic "SLOPE METER"

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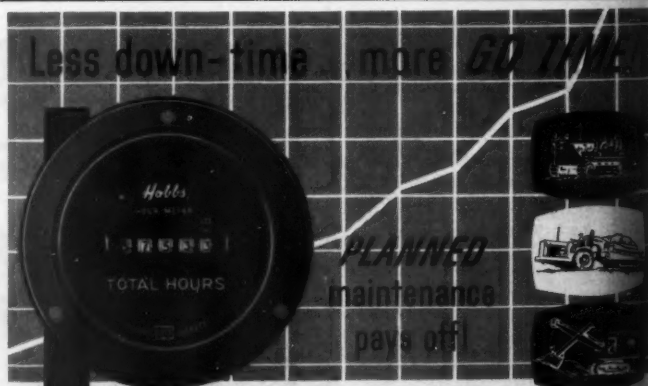
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CONTRACTORS AND ENGINEERS



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**Utility tractor**—a well illustrated catalog covering the Allis-Chalmers Series utility-tractor line and its attached equipment. Stresses such features as low profile, high clearance, power-Crater engines, and short turning. Catalog UT-111.

Write to the Allis-Chalmers Mfg. Co., Dept. C&E, P. O. Box 512, Milwaukee, Wis., or use the Request Card at page 18. Circle No. 149.

**Submersible drainage pumps**—a booklet describing the benefits of first submersible electric drainage pumps, offered in a range of sizes from 1½ to 8 inches. Includes a full-page cutaway drawing of the pump, as well as case histories and photographs of the pumps in use on a variety of jobs.

Write to the Stenberg Mfg. Corp., Dept. C&E, Hoosick Falls, N. Y., or use the Request Card at page 18. Circle No. 34.

**Hoisting-tower accessory**—a brochure on Crete-Quip, a concrete hooper and bucket assembly for use with conventional material-hoisting towers. Explains the labor-saving features of the unit and the advantage of internal mounting of the equipment in the tower cage. A large diagrammatic illustration identifies component parts, and a photo sequence explains the 2-man assembly operation. Bulletin 72.

Write to the Beaver-Advance Corp., Dept. C&E, P. O. Box 792, Ellwood City, Pa., or use the Request Card at page 18. Circle No. 143.

**Asphalt paving**—literature on the methods and materials employed in heavy-duty and intermediate asphalt construction. Discusses plant-mix pavements, asphalt penetration macadam, road-mix asphalt surfaces, and bituminous surface treatment.

Write to Texaco, Inc., Asphalt Sales Division, Dept. C&E, 135 E. 42nd St., New York 17, N. Y., or use the Request Card at page 18. Circle No. 100.

**Forms for prestressed concrete**—a booklet describing the Watco line of steel forms for precast, prestressed concrete. Covers forms for shapes including adjustable square piling, octagonal piling, single-tee joists, Amdek bridge members, and others. Photographs.

Write to the Plant City Steel Corp., Dept. C&E, P. O. Box 1308, Plant City, Fla., or use the Request Card at page 18. Circle No. 32.

**Diesel pile hammers**—a bulletin describing the complete line of McKiernan-Terry diesel pile hammers. Features the new DE-40, with 4,000-pound ram and a mean energy rating of 24,000 foot-pounds per blow. Complete specifications included. Bulletin No. 674.

Write to the McKiernan-Terry Corp., Pile Hammer Division, 100 Richards Ave., Dover, N. J., or use the Request Card at page 18. Circle No. 69.

**Scales**—literature illustrating and describing the wide selection of standard Toledo weighing equipment. Several types of Toledo equipment custom-built to user needs are also briefly described. Specifications listed for each model. Form No. 2001e.

Write to Toledo Scale, Division of Toledo Scale Corp., Dept. C&E, Telegraph Road, Toledo, Ohio, or use the card at page 18. Circle No. 101.

**Unpaved-road maintenance**—a bulletin describing established procedures for spring conditioning of unpaved roads. Discusses what to do with roads that have had calcium chloride in the past, and with untreated, loose-gravel roads. Contains two application charts for easily estimating the total amount of calcium chloride required for various rates of application and road widths.

Write to the Calcium Chloride Institute, Dept. C&E, 909 Ring Bldg., Washington 6, D. C., or use the Request Card at page 18. Circle No. 118.

**External vibrator**—an illustrated fact sheet on the TurboViber, a high-speed, high-intensity, pneumatic external vibrator for concrete-pipe, prestressed-concrete, and related applications. Features include fewer parts, elimination of motor lubrication, and five different mounting attachments.

Write to the Viber Co., Dept. C&E, 726 S. Flower St., Burbank, Calif., or use the Request Card at page 18. Circle No. 90.

**Screed attachment**—a bulletin describing the Model 5M screed attachment for Blaw-Knox concrete-paving spreaders that eliminates the need for an extra finisher. Details a job on which the attachment was used to increase production. According to the literature, this unit also eliminates tears in concrete and requires only a single screw adjustment for making the crown. Bulletin SD-125.

Write to the Blaw-Knox Co., Con-

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Another six units owned by the contractor but with unheated floors are also on-the-job. All twelve have Model MFR bodies with a capacity of 11 to 12.3 yards. Marion hoists are twin underbody arm type Model HD-88.

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The prime contractors, Landers & Griffin, Inc., jointly sponsored with Morrison-Knudsen Co. are building 4.05 miles of Route 93 at an estimated cost of \$2.7 million.

Ed Graves, Equipment Supt., says, "We like Marion bodies and hoists very much. We have used Marions for a long time and will continue to do so. The service provided by Marion's Distributor is beyond compare."

If you want to keep going and ahead of schedule, why not see your Marion Distributor or write direct for profit facts.

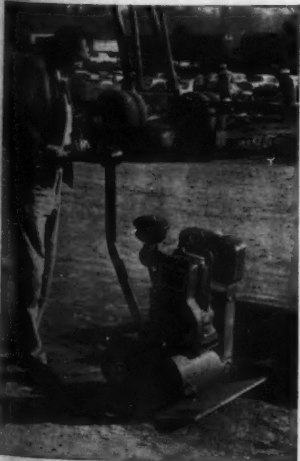
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## Product Literature

struction Equipment Division, Dept. C&E, 300 Sixth Ave., Pittsburgh, Pa., or use the Request Card at page 18. Circle No. 119.

**Portable self-priming pumps**—illustrated literature on MP Flomax portable self-priming centrifugal pumps. Describes four models offering capacities from 105 to 289 gpm. Also describes the firm's Duraflex Model K-6694-B rotary model, with performance data and specifications included. Form No. K-14000.

Write to the Marine Products Co., Dept. C&E, 515 Lyncaste, Detroit 14, Mich., or use the Request Card at page 18. Circle No. 31.

**Portable concrete batchers**—a booklet stressing such features as high productivity, economy, and versatility of Ross Porta-Plants. Details models of 4 and 6-yard capacities. Illustrated with photographs. Brief

data on standard accessories. Form 3-M.

Write to Ross Porta-Plant, Dept. C&E, P. O. Box 446, Brownwood, Texas, or use the Request Card at page 18. Circle No. 45.

**Space heater**—a brochure on the Heat-Master Model H-3 portable LP-gas forced-air furnace designed to deliver 100,000 to 500,000 Btu per hour. Drawings and photographs illustrate text. Complete specifications.

Write to the Agricultural Equipment Corp., Dept. C&E, La Junta, Colo., or use the Request Card at page 18. Circle No. 85.

**Earthmoving equipment**—a handy reference catalog on the complete Caterpillar line of earthmoving equipment. Contains photographs and brief specifications of motor graders, track-type tractors, bulldozers, rippers, Traxcavators, crawler-

drawn scrapers, wheel tractors, scrapers, and wagons; as well as pipelayers, controls, industrial engines, and electric sets. Form D942.

Write to the Caterpillar Tractor Co., Dept. C&E, Peoria, Ill., or use the Request Card at page 18. Circle No. 83.

**Concrete water reduction**—a technical bulletin entitled "Reduction of Water in Concrete Mixes by Chemical Admixture; Effect on Properties." Illustrated with photos and graphs. WRDA Technical Paper No. 1.

Write to the Dewey and Almy Chemical Division, W. R. Grace & Co., Dept. C&E, 62 Whittemore Ave., Cambridge 40, Mass., or use the Request Card at page 18. Circle No. 50.

**Steel forms**—a catalog describing the latest design of Efcu steel forms for concrete construction. Shows how forms are easily locked together with just a twist of a clamp. Also illustrates various form setups for curved walls, tapered walls, tunnels, columns, corbels, and offsets, as well as simple walls. Gives complete specifications. Data also supplied on accessories, supplies, and tools.

Write to Economy Forms Corp., Dept. C&E, Box 128-E, Highland Park Station, Des Moines, Iowa, or use the Request Card at page 18. Circle No. 72.

**Heavy-duty buckets**—illustrated literature on Rex buckets available in sizes from 1/4 yard to 40 cubic yards. Emphasizes such features as all-welded construction, reversible teeth, and all-alloy metallurgical structure. Gives specifications for the Type H heavy-duty bucket offered in capacities from 4 to 12 cubic yards.

Write to the Rex Bucket & Fabricating Corp., Dept. C&E, 211 Fremont St., West Pittston, Pa., or use the Request Card at page 18. Circle No. 147.

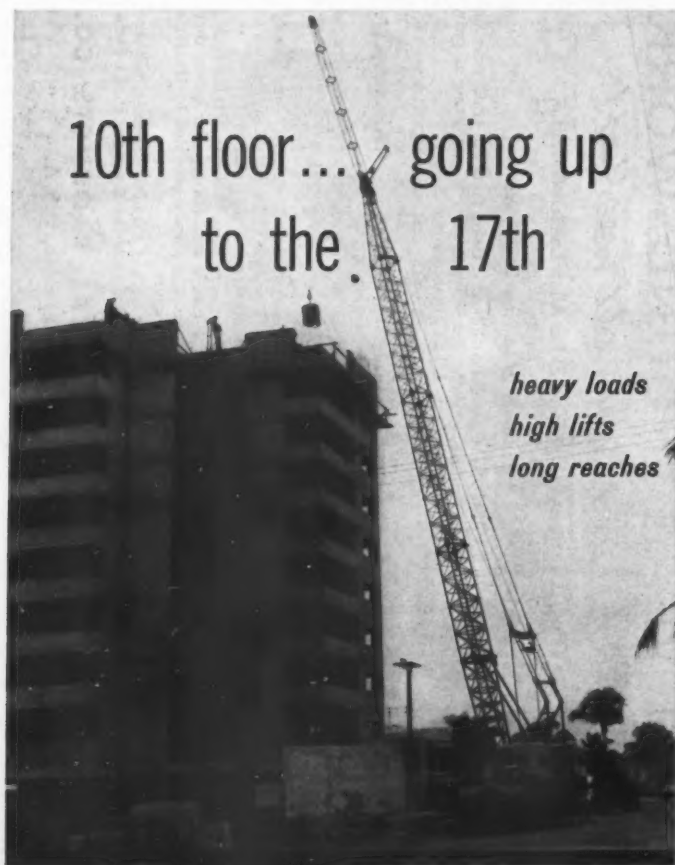
**Power tools**—a catalog on Syntron portable construction tools. Includes specifications and illustrations of self-contained electric hammers and hammer drills. Also contains photos and data on the firm's self-contained gasoline-hammer paving breakers, rock drills, concrete vibrators, and vibrating floats.

Write to the Syntron Co., Dept. C&E, 227 Lexington Ave., Homer City, Pa., or use the Request Card at page 18. Circle No. 22.

**Shovel-crane**—a catalog on Unit Model 1020, series A, a 3/4-ton shovel convertible to trencher, dragline, and clamshell operation, as well as a crane with 12 1/2-ton capacity. Illustrated features include automatic traction brakes; all-weld turntable; smooth disk-type clutch; and a powerful gear-train assembly.

Write to the Unit Crane & Shovel Corp., Dept. C&E, 6411 W. Burnham St., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 10.

**Precast structural members**—a folder describing and illustrating specially designed Flexicore precast concrete structural units. Explains how precast tee-beams, grade beams, rectangular beams and columns, and special beams and lintels can be engineered to fit the individual design and structural requirements of various types of buildings, and how they can be used in a variety of applications. (Continued on page 18)



10th floor... going up  
to the 17th

heavy loads  
high lifts  
long reaches



● Building a new apartment in Fort Lauderdale, Fla., the Harrison Crane Service of Miami pours concrete and lifts materials with this Waukesha Engine powered P & H crane. Here at the 10th floor, crane has a 170-ft. boom. From here, up to the 17th floor top, boom will be 200 ft.

Waukeshas are standard for crane operation. This P & H crane is powered by Model 140-GK—4 1/2 in. x 5 1/2 in. bore and stroke; 525 cu. in. displ. Model 140 Series gasoline engines available up to 225 hp. Other models for crane or shovel installation, up to 1200 hp., Diesel or gasoline.

**WAUKESHA** powered

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK

TULSA

LOS ANGELES

Factories — Waukesha, Wisconsin, and Clinton, Iowa

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**SALES RENTALS** CAPACITY TO 600 TONS

FOR: PILE TESTING • UNDERPINNING • BRIDGES • PIPE PUSHING

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**DESIGNERS and MANUFACTURERS OF Hydraulic Units For Special Applications**

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this **LIGHT STAYS LIT!**

Super Rough Service

**STURDILITE**

Typical field report:

Heckett Engineering Co., Butler, Pa., says: . . .

"We used to replace at least one bulb each night in the floodlights of our magnet crane.

Our crane picks up and drops a 20-ton ball. The shudder and quake is death on conventional floodlights.

Seven weeks ago we installed STURDILITES, and the original bulbs are still burning!"



Patent Pending

10 to 100 times longer lamp life under heavy vibration . . . that's the actual record of new STURDILITE flood lights, in the field. Remarkable bulb savings and improved lighting are being demonstrated in a wide range of rough service installations. STURDILITE is the only floodlight with syncho-harmonic design for positive shock suppression. Available in 6 to 120 volts in models for all requirements in heavy construction, mining, quarrying, industry, transport, etc. Write for literature

**PHOENIX PRODUCTS CO.**

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CONTRACTORS AND ENGINEERS



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### ON FABULOUS PROJECTS ... FAMOUS DRILL BITS

**LEFT HAND PHOTO**  
The Niagara Power project includes one of the world's largest rock removal jobs. Sharing the work of chewing out millions of yards of rock at the site of the main generating plant, Brunner & Lay carbide Rok-Bits were used regularly by Merritt-Chapman & Scott Corp.

**RIGHT HAND PHOTO**  
On the large drills, 4" and 4 1/2" Brunner & Lay carbide 1-7-5 Rok-Bits drilled 24 hours a day, month after month. On the crawler drills, 3" Brunner & Lay 700 Rok-Bits were used, while for line drilling 2 1/4" 700 carbide Rok-Bits. Request descriptive literature.



**Brunner & Lay  
CARBIDE ROK-BITS**

For details on this, and other difficult low-cost Brunner & Lay Rok-Bit drilled jobs, call your Brunner & Lay dealer or our nearest plant. Write for NEW bulletin 759. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. 77 progressive years. Plants & conversion shops: Albuquerque, Asheville, Birmingham, Denver, Dorchester (Boston), Long Island City, Los Angeles, Philadelphia, Portland, Sacramento, Seattle, Yardley (Spokane), Lachine, P. Q., Vancouver, B. C.

### Brunner & Lay Products

CARBIDE ROK-BITS • INTRASET STEEL • DRILL RODS • COUPLINGS, ADAPTERS & SECTIONAL STEEL  
Standard or ROPE thread • MOIL POINTS, CLAY SPADES, ASPHALT CUTTERS, etc.

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Sets up in minutes... accurate, precision weighing *on-the-site*. Complete steel deck construction. Low original cost... no maintenance costs. Can be installed as a pitless scale. Saves pit costs. WRITE OR WIRE FOR BULLETIN 601

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### WANTED

Heavy duty, panel type tubular steel hoisting tower—200' high.  
**Universal Scaffolding Corp.**  
1359 Viale Ave., Bronx, N. Y.  
WY 1-2500

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## Product Literature

(Continued from page 178)

have been used on specific jobs. Illustrated with detail drawings and photographs.

Write to The Flexicore Co., Inc., Dept. C&E, 1932 E. Monument Ave., Dayton 1, Ohio, or use the Request Card at page 18. Circle No. 40.

**Versatile excavator**—a catalog on Lorain's Model L85A 2½-yard power shovel, which is available also as a crane, clam, dragline, and hoe. Emphasizes such features as the "shear-ball" connection, 2-lever joystick controls, and square-tubular-chord crane boom. Covers details of the machine's construction and has pictures of the 85A at work.

Write to The Thew Shovel Co., Dept. C&E, 28th and Fulton Road, Lorain, Ohio, or use the Request Card at page 18. Circle No. 111.

**Soils testing, other services**—a brochure describing the complete range of soils and foundation testing services offered by the American Testing & Engineering Corp. Illustrations show typical ATEC boring, sampling, and testing procedures. Specialized engineering services, which include the design of natural earth structures, compaction control, construction inspection, and concrete testing, are described in detail.

Write to the American Testing & Engineering Corp., Dept. C&E, 5204 E. 25th St., Indianapolis, Ind., or use the Request Card at page 18. Circle No. 86.

**Aggregate processing**—a brochure describing Cindaco's services and equipment, including research, engineering, and design of complete processing plants for aggregates, concrete, and asphalt.

Write to Cindaco, Inc., Dept. C&E,

127 E. Second St., Dayton 2, Ohio, or use the Request Card at page 18. Circle No. 12.

**Paving spreader**—a folder detailing the construction and performance characteristics of the Jersey spreader. Photos show the unit in three views. Specifications and on-the-job photographs included.

Write to the Tractor Spreader Co., Dept. C&E, 630 Terrace Ave., Hasbrouck Heights, N. J., or use the Request Card at page 18. Circle No. 89.

**Scaffolding**—literature describing Hoist-O-Matic scaffolding. Lists such features as a design which permits the scaffolding to be raised, by one man, while work is in progress. Text illustrated with photographs.

Write to the Union Metal Products, Inc., Dept. C&E, 795 Tanglewood, Memphis, Tenn., or use the Request Card at page 18. Circle No. 35.

**Oil-burning salamander**—a literature on the California oil-burning salamander for inside outside spot or space heating. Unit's return-gas design is said to eliminate soot and smoke.

Write to the California Heater Co., Dept. C&E, 1511 W. Second St., Pomona, Calif., or use the Request Card at page 18. Circle No. 37.

**Photocopy equipment**—a brochure covering the benefits of Apeco photocopy equipment. Each model in the company's Auto-Stat line of copiers is described in detail.

Write to the American Photocopy Equipment Co., Dept. C&E, 2108 Dempster St., Evanston, Ill., or use the Request Card at page 18. Circle No. 141.

**Contraction-joint setter**—a brochure on Pemco transverse and longitudinal contraction-joint setters designed for adjustment to 20, 22, and 25-foot-wide pavement. Includes drawings and photographs illustrating use.

Write to Pemco, Inc., Dept. C&E, 7 N. Roselle Road, Roselle, Ill., or use the Request Card at page 18. Circle No. 43.

**Automatic curbers**—a specification sheet on Stephens-Canfield automatic curbers for asphalt or concrete curbs. Dimensional drawings show typical mold designs; all molds are interchangeable.

Write to Power Curbers, Inc., Dept. C&E, P. O. Box 1465, Salisbury, N. C., or use the Request Card at page 18. Circle No. 44.

**Steam cleaners**—a fact sheet on the Northeast Model MD40 Jet steam cleaner. According to the literature, the unit takes only 10 minutes to get up steam and does not require skilled labor to operate or maintain it. Photographs and specifications included.

Write to Northeast Industries, Inc., Dept. C&E, 282 Greenwood Ave., Highland Park, N. J., or use the Request Card at page 18. Circle No. 41.

**Bucket-dozers**—literature describing the Dodge bucket-dozers for trenching and shoveling. Lists such features as complete clam action, full scrap carry, fast loading, and full-view bucketing. Illustrated.

Write to the Dodge Steel Products Co., Dept. C&E, 70 Washington St., Salem, Mass., or use the Request Card at page 18. Circle No. 81.

## You hear it\* all around the country...



## "We eliminated customer complaints"\* with Johns-Manville Placewel—the quality admixture

When contractors no longer complain about harsh, segregated mixes, the ready mix operator knows these buyers have become steady, satisfied customers.

And that's just what's happening everywhere today. Smart ready mix men are adding J-M Placewel® to their mixes and giving their customers concrete that is—

- more workable • easier handled
- free from honeycombing, sand streaking, and segregation
- more impermeable

Engineers and architects, too, know the value of liquid Placewel. Every day more and more of them are specifying Placewel for "quality" concrete. Construction and maintenance costs are reduced while concrete strength goes up as much as 30%.

One handy 55-gallon drum will treat 600 cu/yds. of concrete. Let a Johns-Manville Concrete Technologist demonstrate the big quality and profit story that Placewel holds for you. For his location, write Johns-Manville, Box 14, New York 16, New York.

"We eliminated customer complaints when we started using Placewel," say these successful ready mix operators:

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Abbott & Newman, Inc., Fort Worth, Texas  
Robt. Simmons—Plant Supt.  
Bay Concrete Industries, Tampa, Florida  
T. E. Snure—Materials Engineer  
Cooney Bros. Inc., Tarrytown, New York  
W. C. Wilson, Sr.—President  
E. A. Wilson Company, Lowell, Mass.

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your  
voice



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and save money, too!

—speak as you normally would—  
be clearly heard and understood up to ½-mile away!

Unique transistorized power megaphone—an instrument you will be proud to own. Gives up to 6,000 two-second amplified messages from standard replaceable battery. Light (3¼ lbs.)—easy to handle and use. Attractive red and gray polyethylene—built for abuse. Attractively priced for you, too!

WRITE for particulars — and free, informative "Sounds for Safety" folder! Dept. C3  
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CONTRACTORS AND ENGINEERS



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ENGINEER



**Job for Autocar...** This six-wheel drive C5566 gets the mix to the site regardless of weather or terrain.

# New 6 x 6 mixer goes through thick and thin ... thanks to Autocar

This is really an all-weather, all-terrain job—one of those where nothing less than an Autocar would do. In a hole or up a hill, on shifting sand or in sticky gumbo, this all-wheel-drive Autocar delivers the mix

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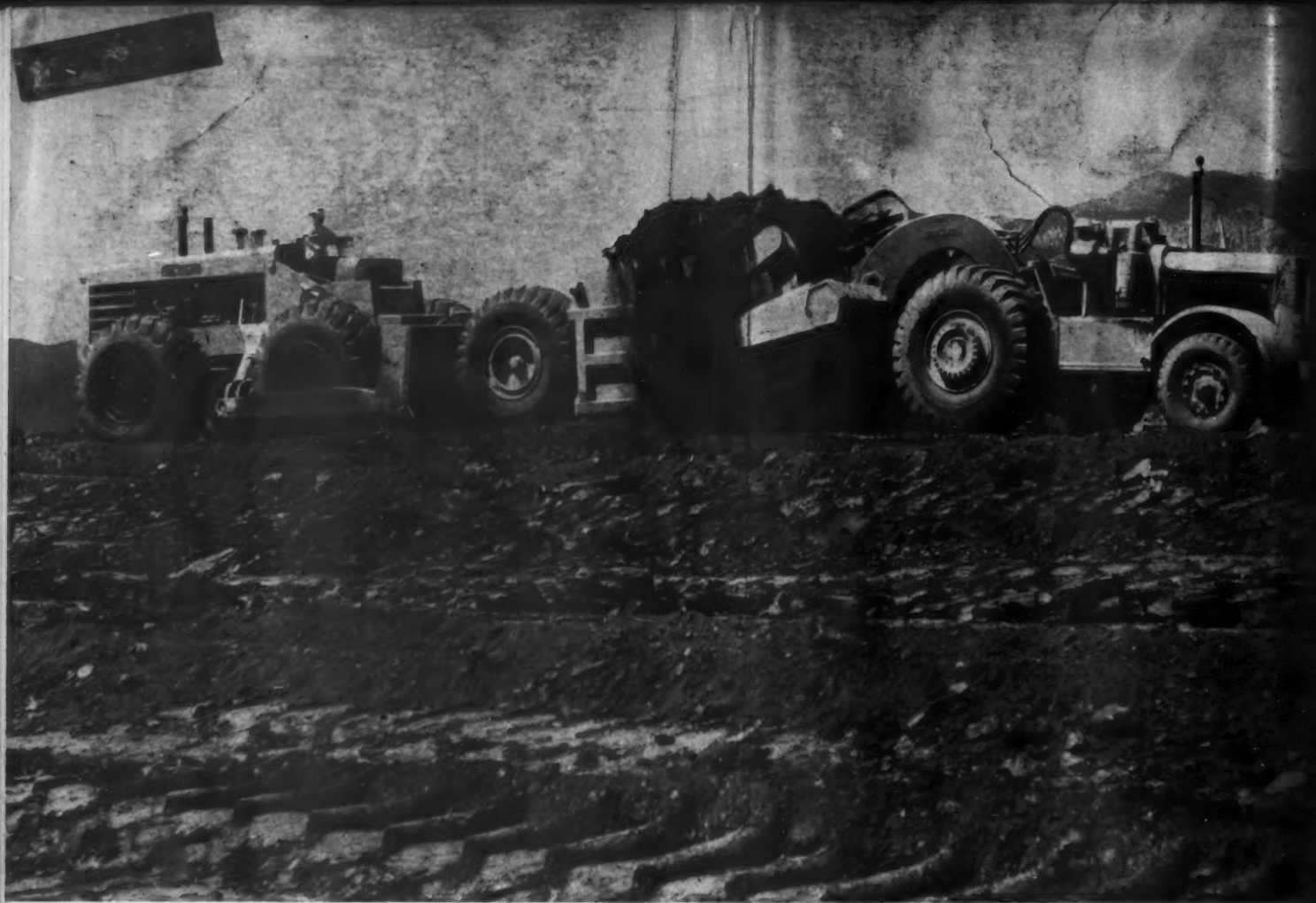
plus Autocar quality means that it will stay on the job longer with greater economy. Why settle for less than the "World's Finest?" White-Autocar comprehensive service throughout the U. S. A.



Division of  
The White Motor Company  
Exton, Pa.

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*One pusher: 22.0 pay yards, 45 seconds*

## 600 hp Michigan Dozer replaces tandem-crawler team

When C. L. Hubner Company, Denver, won a pair of adjacent contracts totaling 14.3 miles of divided highway in northern Colorado, they were faced with 2.4-million yds of unclassified excavation. Much of the borrow had to be taken from the *bottom of a flowing creek*. Should they use draglines and separate haul units or pump the water out and use a pusher-scraper fleet? Economics dictated scrapers.

The stream was ditched and water pumped out by sections as a pair of big crawlers, working in tandem, push-loaded 27 yd scrapers. But this method of pushing was costly and Chuck Loser, Project Supt, wanted faster production. For a year now, his company had owned a Michigan Model 480 Tractor Dozer. It was working in another pit. They called it in.

### 600 hp Michigan Tractor Dozer steps up production

The question was, "Could the rubber-

tired Michigan work in the wet, sandy clay?" Its 600 hp was greater than that of the two crawlers combined. Its 104,000 lb operating weight was about equal to that of the two crawlers combined. With power shift and torque converter, dozer-to-scraper contact was smooth. The wide-base, hydroflated 33.5-33 tires took hold. And the Michigan, alone, did what previously took two big crawlers. Another production problem was solved.

### One Model 480 leads to another

For the first time, the firm had found a pusher that could, *by itself*, effectively load their big 27 yd scrapers under almost any condition. It only seemed logical that a firm of Hubner's size could benefit by owning *two* Model 480's. And they have. A second Michigan was recently purchased.

### 2 Michigans load 12 scrapers

The two Michigans today often load a fleet of 12 to 13 scrapers on haul cycles from 600 feet to 6 miles. Pushing 27 yd scrapers, each Michigan regularly loads a scale-weighed average of 22.0 pay yds. Load time averages 45 seconds. Material has been generally sandy clay, similar to that found most anywhere in the country.

Perhaps Michigans can give you similar cost-cutting advantages. Besides the 600 hp Tractor Dozer there are 375, 262, and 162 hp models. Call us for a no-obligation demonstration.

Michigan is a registered trademark of  
**CLARK EQUIPMENT COMPANY**  
Construction Machinery Division

**CLARK®  
EQUIPMENT**

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Benton Harbor 28, Michigan  
In Canada:  
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St. Thomas, Ontario

For more facts, use Request Card at page 18 and circle No. 452



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